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ABSTRACT

The Communication Tech and Policy section of the Proceedings contains the following 14 papers: "Interactivity Reexamined: An Analysis of Business Web Sites" (Louisa Ha and E. Lincoln James); "Newspaper Size as a Factor in Use of Computer-Assisted Reporting" (Bruce Garrison); "The Rural-Urban Gap in Community Newspaper Editors' Use of Information Technologies" (Douglas Blanks Hindman, Stan Ernst, and Mavis Richardson); "Online Newspapers: Living Up to Their Potential?" (James W. Tankard, Jr., and Hyun Ban); "Digital Imaging and the Photojournalist: Work and Workload Issues" (John Russial); "The Convergence of the Web and Television: Current Technological Situation and Its Future" (Seungwhan Lee); "On-Line or Off-Base? A Pilot Study to Determine Undergraduate Student Perceptions about Offering a Journalism/Mass Communication Course on the Web" (Barbara J. DeSanto and J. Steven Smethers); "The Tease Effect of Slow Downloading: Arousal and Excitation Transfer in Online Communication" (S. Shyam Sundar and Carson B Wagner); "The Effects of Hypertext on Readers' Recall Based on Gender" (Moon Jeong Lee); "The Role of Local Government in Information Age after the Passage of the Telecommunications Act of 1996" (Kuo-Feng Tseng); "The Dimensions of Truth: The Case of Northwest Airlines versus WCCO-TV" (Steve LeBeau); "The Unique Nature of Communications Regulation: Evidence and Implications for Communications Policy Analysis" (Philip M. Napoli); "Mass Media and the Concept of Interactivity: An Exploratory Study of Online Forums and Reader E-Mail" (Tanjev Schultz); "Interactivity: A Qualitative Exploration of Definitions and Models" Sally J. McMillan and Edward J. Downes); and "Computerization of Taiwanese Newspapers" (Li-jing Arthur Chang). (RS)

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# PROCEEDINGS OF THE ANNUAL MEETING OF THE ASSOCIATION FOR EDUCATION IN JOURNALISM AND MASS COMMUNICATION (81st, Baltimore, MD, August 5-8, 1998).

## COMMUNICATION TECH AND POLICY.

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# Interactivity Reexamined: An Analysis of Business Web Sites

Louisa Ha, Ph.D.
Research Director
The Gallup Organization
27777 Franklin Road, Suite 300
Southfield, MI 48034
Telephone: (248) 213-0288
Fax: (248) 213-0388
E-mail: Louisa_Ha@gallup.com

and

E. Lincoln James, Ph.D.
Professor
E. R. Murrow School of Communication
Washington State University
Pullman, WA 99164-2520.

A paper accepted by the Communication Technology and Policy Division, Association for Education in Journalism and Mass Communication 1998 Annual Convention, August 5-8, Baltimore, Maryland

# Abstract

This study reexamined the concept of interactivity and proposed that interactivity be defined as the extent to which the communicator and the audience responded to each other's communication need. Interactivity was construed as comprising five dimensions: 1) playfulness, 2) choice, 3) connectedness, 4) information collection, and 5) reciprocal communication. Business web sites were analyzed in order to illustrate the application of interactivity dimensions on the web. Content analysis of 110 web sites showed that web sites are not necessarily interactive. Many of them scored low in most dimensions of interactivity. Web sites of products, services, and retail outlets appeared to differ significantly in terms of connectedness, information collection and reciprocal communication.

the traditional print and electronic media. The name of the technology, the World Wide Web, easy-to-remember and vividly illustrate the worldwide connection function of the system, also makes it an anticipated success. In terms of low complexity, the what-you-see-is-what-you-get format of web browsers makes it user-friendly and reduces the perceived complexity of the medium. Finally, the Web has high trialibility. Triability is the degree to which an innovation can be sampled in small quantity or with low cost. The open access to the Web through computers at work or public libraries minimize the risk for consumers to try out the technology.

A major force behind the growth of the Web is its potential for generating revenue. A recent report by ActivMedia (1997) on 3,500 net marketers estimated that the revenues generated from the Web would be around US$24.4 billion in 1997. Most of the revenues (85%) came from product and services sales or fees and online advertising. The rest of the revenue came from equipment and web site development. Some 65% already claimed to be enjoying profits. Web sites with more experience on the Web are more likely to report making profits than those who are new to the Web. Although one may cast doubt on the validity of the statistics because of the study sponsor's vested interests in the Internet, the proliferation of Internet-related publications and research indicates that the Web has at least become a viable business opportunity that many want to cash in. The growing interest of businesses in establishing presence on the Web is shown in a national study of 367 marketing executives in the U.S. In 1996, 17% of them reported that their companies had web sites, 31% of the companies planned to set up a web site in the next six months (Paustian, 1996).

This study first attempted to deconstruct the meaning of interactivity and then reported the results of a content analysis which evaluated the interactivity levels of business web sites using the study's definition of "interactivity." Business web sites are chosen over other web sites to study interactivity because business web sites are the most common type of web sites. They are most likely to benefit from interactivity and possess resources to provide the financial support that drives the technological development of the Web. Indeed, as of April 1997, 88% of all registered domain names on the Web were commercial domains ending with ".com" (Kosters, 1997).

## The World Wide Web as a Medium

Although the Web is still a medium accessible only to computer users, it has reached the "critical mass" threshold suggested by Rogers (1995) that future rate of its adoption becomes self-sustaining. In addition, the Web can also be easily accessed using traditional TV sets through TV-based online services such as WebTV or NetChannel using a special device. The device, which resembles a remote-control, is available from major electric appliance manufacturers such as SONY and Magnovox. Although WebTV has only 150,000 subscribers after the first year in the market (Magill, 1997), the alternative of accessing to the Web through traditional TV sets will facilitate the penetration rate of the Web among the general public.

Unlike traditional mass media which represents a one-to-many communication model, the Web represents both a many-to-one and a many-to-many communication model (Hoffman, Novak & Chatterjee, 1995; Morris & Ogan, 1996). Many individual consumers can initiate communication to the same web site at the same time. The many-to-many scenario is unique to the Web because many points of originations and destinations coexist at the same time in cyberspace. With features such as cyberchat or listserv mailing lists connecting people from different points to locate people with common interest to them at the same time, the Web becomes the middleman for the many-to-many communication to occur. There is no single source of message origination or single source of destination on the Web. Negroponte (1996) describe such use of computer networks as a "digital age" in which all information is digitized. Everyone has the right to disseminate message. Different perspectives can be freely circulated on the Internet. Information is customized to the demand of the consumer. Gilder (1990) predicts the new computer technology will increase the power of the people by blowing apart "all the monopolies, hierarchies, pyramids, and power grids of established society." (p.31) The medium will change from a mass-produced mass consumed commodity to an endless feast of niches and specialties.

As a marketing communication medium, the Web has been described as "a cross between an electronic trade show and a community flea market" (Berthon, Pitt & Watson, 1996, p. 44). It allows visitors to browse the company's products or services at the user's own pace as well as facilitates informal communication between the company and the consumer. Consumers who do not like face-to-face communication in real trade shows and flea markets can avoid it by browsing the Web while enjoying the same experience. Indeed, a web site can perform many different functions for a business, its consumers, and other stakeholders such as investors and employees.

Among some of the most widely used marketing functions of the web are its ability to: 1) provide consumers with continuously updated product information without the limitation of space; 2) generate qualified leads for salespeople by identifying customer queries; 3) support customer service so that customers can contact the company any time they wished and the company could handle complaints and suggestions; 4) serve as a customer research tool, collecting consumer information by conducting surveys and monitoring visitor behavior on the web; 5) conduct sales promotion activities such as giveaway samples for computer software through free download services, distributing electronic coupons and inviting customer participation in sweepstakes; 6) distribute and accept orders from visitors during the web site visit; and, 7) hold the attention of consumers through an interactive input-output process and customize communications precisely to individual consumers (Balthazard & Koh, 1997; Berthon, Pitt & Watson, 1996; Hoffman & Novak, 1996; Stern, 1995), and 8) project a favorable corporate image as an high-tech and a customer-oriented company (Maddox & Mehta, 1997);

## The Concept of Interactivity

Interactivity is a critical concept in computer-mediated communications as the key advantage of the medium (Morris & Ogan, 1996, Pavlik, 1996; Rafaeli & Sudweeks, 1997). Technologists such as Ted Nelson (1990) suggest that human-computer activities exemplify the human impulse to create interactive representation. The outcomes of interactivity are engagement in communication and relationship building between the company and the consumers. Researchers have noted that the quest for improving interactivity guides the directions for future technological development for the Web (Robb et al., 1997).

From an interpersonal communication perspective, interactivity has been defined as "the extent to which messages in a sequence relate to each other, and especially the extent to which later messages recount the relatedness of earlier messages" (Rafaeli & Sudweeks, 1997, p. 3). In a similar token, Walther and Burgoon (1992) use face-to-face communication as the standard of interactivity and evaluate the interactivity of mediated communication such as the Internet by how close it simulates face-to-face communication. From a mechanical perspective, interactivity has been defined as "the extent to which users can participate in modifying the form and content of a mediated environment in real time" (Steuer, 1992, p. 84). Using an artistic approach, Laurel (1996) contends that interactivity is an experience just like acting in a theater. Many agents participate within representation contexts in computer-human interactions. In a business setting, interactivity tends to be seen as "the combination of rich content, active intelligence, collaborative communications to create a compelling consumer experience" (Robb et al., 1997, p. 5) or "a person-to-person or person-to-technology exchange designed to effect a change in the knowledge or behavior of at least one person" (Haeckel, 1998, p. 64). These approaches to interactivity can easily lead to subjective interpretation of what interactivity is because individual have different perceptions of richness, engagement, fantasy, or relationship with previous messages. Moreover, Steuer's mechanical perspective is not quite applicable to the Web. For example, if an individual visitor writes a message to the webmaster, he will not be considered interacting with the web site because he does not modify the form or content of a web site.

Despite its importance, discussions of interactivity have been filled with a restrictive assumption that requires a close reexamination. This assumption is that a reciprocal, two-way communication is a common desire of both the communicator and the audience. For example, Rogers (1995) define interactivity as "the degree to which participants in a communication process can exchange roles in and have control over their mutual discourse." (p.314). In a similar token, Rafaeli and Sudweeks (1997) describe interactivity as "a condition of communication in which simultaneous and continuous exchange occur, and these exchanges carry a social, binding force" (p. 4). These definitions, emphasizing "exchange" and "mutuality", assume the audience is interested in participating in conversations with the communicator. In a business setting, this means that all consumers do want to communicate with companies. Studies of computer-mediated communication audience behaviors have shown that this is an invalid assumption. For example, in electronic discussion groups, some members are quiet observers and lurkers who never speak up, while other members are active participants who contribute frequently to the discussion (Ha, 1995). The reasons for using the Web may be different from person to person. Some people are goal-directed and may want to complete a task through visiting a web site; others may simply be net surfers who are only curious and relish the fun of finding out what is on the net (Hoffman and

Novak, 1996).

Companies are assumed to be interested in interactive communication with consumers. The advocates of relationship marketing contend that more communication between the consumer and the company will build the relationship between the two, and hence ultimately result in more sales (Haeckel, 1998; Hoffman, Novak & Chatterjee, 1995). This profit incentive, it is argued, will lead a company to emphasize interactivity. Nevertheless, it must be borne in mind, that despite this attribute, it may not be economical and feasible in many instances for a company to communicate with all of its consumers. Only a certain level of interactivity may be optimal and in the best interest of a company.

## The Five Dimensions of Interactivity

Discarding the unrealistic notion of mutual interest in two-way communication, this study proposes that interactivity should be defined in terms of *the extent to which the communicator and the audience respond to, or are willing to facilitate, each other's communication needs*. This definition accommodates individual differences in communication needs. Sometimes, the audience only wants low levels of communication such as having the freedom to navigate within a web site and the fun of selecting different options without having direct contact with the company. Sometimes, the audience may want immediate assistance from a company, such as technical support information, to solve a problem. Given these constraints, interactivity may be perceived to consist of five dimensions capable of fulfilling different communication needs of the participants during the communication process. These are: 1) playfulness, 2) choice, 3) connectedness, 4) information collection, and 5) reciprocal communication.

### 1. *Playfulness*

Toys and games have been human companions since prehistory and are childhood phenomena of all cultures and civilizations. Indeed, the excitement of psychological gratifications in winning a game can largely explain why both adults and children spend a large amount of time on playing games electronic or otherwise. The desire to demonstrate one's own competence is an important motive to engage in play and to enjoy games (Holbrook et al., 1984). By displaying mastery and control in games, one can reinforce one's self-esteem (Wilson, 1981). Csikszentmihalyi (1975) describes the game player's feelings of satisfaction as a "flow experience," so engaging that he or she ignores everything elsewhere. After studying consumers' evaluations of five different web sites, Eighmey (1996) concluded that a successful web site must combine both entertainment and information to add value in the eyes of the consumers.

Play has been argued as one purpose of communication (December, 1996) Stephenson(1967) in his Play Theory on Mass Communications, argue that xxxx.. The Web, as a computer device, can perform a lot of input-output functions with the click of a mouse or a joystick that enhances its playfulness and entertainment value to the visitor. Such input from the consumers is considered as the essence of interactivity by web designers (Digital Output, 1997). Bryant and Love (1996) contend that information technology enhances and alters the entertainment experience of audiences.

The games on many web sites are very similar to video games and gameboys with which many individuals are familiar, and in which many people have indulged themselves. The fun of games is the sense of success enjoyed by the player. Moreover, the curiosity arousal devices such as questions and answers on a web site are similar to popular game shows on TV such as Jeopardy. These games and curiosity arousal devices on the Web tend to be solitary games for individuals. Their presence provides a playful environment in which an audience member can communicate with himself/herself. Strictly speaking, this playfulness dimension of interactivity is within oneself, rather than an interaction with another person. Yet the communication need of an audience member on many occasions is merely a desire to communicate with himself/herself rather than with other people. To the extent that the communicator is able to electronically satisfy the self-communication needs to the audience, the games on web sites can qualify as interactivity devices. Therefore, it is reasonable to conclude that playfulness as a critical aspect of interactivity.

### *2. Choice*

The choice dimension of interactivity may be seen as consisting of the availability of choice and the unrestrained navigation in the cyberspace. Choice is closely related to the first dimension of interactivity—playfulness—because it is also an internal emotional sense of satisfaction. Steuer (1992) and Laurel (1991) share similar notions of choice as a dimension of interactivity when they discuss the "range" of interactivity as the amount of variation possible within each attribute in a mediated environment. Yet "range" is not be the best descriptor of the choice dimension because choices available to web visitors may be discrete, rather than a continuum with quantitative difference.

As a result of this perceived choice availability, an individual may feel empowered by being able to choose from among several different available alternatives (Gilder, 1990; Pavlik, 1996). No obligation is necessary when a navigator wanders through a web site and has the option of terminating the communication at any given time. Choice may also be associated with minimizing effort toward the achievement of a task as well as enjoyment during a site visit. For example, by giving the option to choose a particular language when navigating, a web site provides accommodation to visitors of different groups of individuals. Providing a choice of text and graphics browsers allow visitors with different web browsers to access the full content of the web site. Thus, site visitors would not feel disadvantaged when they do not meet the technical requirements of the top-end technology used in the web site. By providing different alternatives during the navigation process, visitors are greeted with friendliness and feel respected. When the visitor is contented and feels empowered, that individual will more likely spend a greater amount of time in the web sites, exploring alternatives and learning the materials.

### *3. Connectedness*

For site visitors, hypertexts in web sites can create a feeling of connectedness to the world by allowing visitors to jump from one place to another in the cyberspace without much effort (Synder, 1996; Krol, 1996; Franks, 1995). Such characteristic of hypertexts broadens the experience of the visitor. With appropriate mapping of hypertexts and images, visitors can interact with the web site content just like physically present in a natural environment (Steuer, 1992). In a web site that simulates a showroom, for example, a visitor can can feel themselves virtually present at that showroom and get questions answered through the click of a mouse. He or she is no longer confined to his study room or computer lab, but is connected to the outside world. Robb and his colleagues (1997) called this a state of "rich content" when consumers can take action and derive value from complete and relevant information. Companies, by providing such eye-opening connected experience to consumers in their web sites, fulfill individual information needs of consumers as well as engender trust in their companies. With minimal effort required to access bits of information, consumers can learn much faster through convenient exploration. For example, an individual searching for information about a car can browse the product information for different models through the internal product hyperlinks within the web site. That individual can then do a comparison either through a third-party product hyperlink available on the web site, or go to another web site either listed in that web site, or get there via a search engine. Another example is the instance where the individual is a job applicant or potential investor and needs to know more about a company. That person can simply click on the employment hyperlink or corporate hyperlink in the web site to obtain additional information.

The connectedness dimension of interactivity can accumulate over time. Walther and Burgoon's (1992) experiment comparing computer users in doing tasks versus face-to-face communication suggests that the lack of non-verbal cues in computer-mediated communication can be compensated by the computer users' accumulation of time or experience. They can understand their communication counterparts as well as face-to-face communication after acquiring experience with the context of the communication. In addition to the textual information, video-clips, audio-clips, animated graphics available on the Web can enhance the feeling of connectedness by showing non-verbal cues such as action, facial expression, and tone.

### 4. *Information Collection*

Data gathering is primarily the communication need of the communicator..It is becoming more important to companies as they build databases about their customers and move into the practice of integrated marketing communications (Blattberg & Deighton, 1991). With more information about the audience, an organization can customize messages according to the interest and prior knowledge level of the audience. In the mass media industry, audience measurement is the more common term used to describe the process by which the communicator systematically collects data about individuals who consume media. Such information generally includes demographics, psychographics, and sometimes personality characteristics of the audience. Although it is a common belief that better informed communicators can provide better communication to potential consumers, many audiences do not think in this way. They often resist giving out information about themselves consider this as an infringement of their privacy and.

Information collection on the Web takes a much more variety of forms than on traditional media. It can be in a form of admission requirement such as visitor registration or can be recorded automatically as cookie files without the awareness of the visitor (Dreze & Zufreyden, 1997). Cookie files are data that are transmitted by a web server to a client computer. They store the user's ID or internet address from where the user logs onto the web server and prior visit pattern information (Leibrock, 1997). Browsers can only alert the user that a cookie file comes from the web server if the web site that the user clicks on to visit. If the user refuses the cookie file, he cannot continue the web site visit. Therefore, the information collection dimension of interactivity consists of the audience's willingness to give out information or the automatic recording of audience data. The original purpose of information collection should be facilitating the communicator design better messages for future communication. Although it is possible for businesses to sell the information collected from consumers to another institution, doing so without their prior consent is both unethical and unfair to consumers

### 5. *Reciprocal Communication*

In the traditional mass media mode, communication is usually "one-way" in which the communicator disseminates messages to a large audience with no expectation of feedback from the audience. Because it is an interactive medium, a web site could be perceived as an invitation for visitors to do something (Sterne, 1995). A consumer can initiate a communication with a company by visiting a web site and send a message to the webmaster, or respond to the webmaster during or after visiting a web site. To involve the consumers and encourage feedback, a company has to provide content that is useful to the consumer and not simply self-promotional materials (*Internet Marketing and Technology Report*, 1997). By providing information to consumers, the company expects response and feedback in return, forming a reciprocal communication loop.

The more response and feedback the audience gives to the communicator, the more the communicator can respond to the particular needs of the audience. For example, if the audience is only interested in compact cars, the web site can customize to the audience's interest by sending only information on compact cars to them directly. Such dialogues between the communicator and the audience are also called collaborative communication (Robb et. al., 1997). At the extreme, it may be difficult to distinguish between the communicator and the audience because both have the power to initiate contact and to receive messages. The individual consumer, for example, after visiting a web site, may start sending messages and information through e-mails and personal web pages. He or she can also order products directly on a web sites if it contains electronic commerce devices. In a reciprocal relationship, there is an initiator who is expecting a return. In business settings, the initiator is usually but not necessarily a company.

Among the five dimensions of interactivity, one may consider some dimensions such as *information collection* and *reciprocal communication* as higher level of interactivity because they involve direct, two-way exchange of messages between the communicator and the audience. These dimensions of interactivity are also source-oriented because the source is the major benefactor of that interactivity. Dimensions such as playfulness, choice, and connectedness may be deemed as simply self-communications that substantially have no direct bearing on the source (company). They can be considered as audience-oriented interactivity because the audience play a major role in the communication process, the web site only provides the necessary device for the audience to meet their needs. To the company, the audience-oriented dimensions of interactivity are baits to the visitors to lead them to the source-oriented interactivity. To general consumers, they may be appreciate audience-oriented interactivity more than source-oriented interactivity because source-oriented interactivity involves some risks such as privacy or identity disclosure and requires more effort from them. Nevertheless, to examine the interactivity of the Web, all these dimensions have to be taken into consideration.

## Research Questions

The purpose of this study was to examine the different dimensions of interactivity in practice on the Web with a sample of business web sites. Interactivity was defined in terms of the five previously discussed dimensions. Certain dimensions of interactivity may occur more often at specific moments during the site visit than other moments. As high-level interactivity involves risk and efforts from the consumer, one moment may be considered more favorable to induce that interactivity than other moments by the web designers. A business web site may score high in some dimensions but low in other dimensions. The score in each dimension may be influenced by a lot of factors such as the nature of the business and the intentional functions of the web site to a company. For example, if a web site is created for conducting electronic commerce, a high score on reciprocal communication and connectedness can be expected to allow visitor to make purchase decisions on the spot and using reciprocal communication to conduct the business transaction on the Web. Since we were unable to determine the intentional functions of the web sites, we limited the study on the differences in interactivity dimensions by the business types. Three questions relating to the dimension type and the timing that high levels of interactivity dimensions occur were posed in this study:

1. *Which dimension of interactivity was more prevalent in early business web sites? How did business web sites fare in interactivity?*

2. *When did high level of interactivity occur? Before or during a web site visit?*
3. *Were there significant differences between business types in their interactivity scores?*

## Methodology

A content analysis of business web sites was conducted in order to examine the applications of the five dimensions of interactivity. The web sites were categorized into eight formats according to the classification suggested by Hoffman et al. (1995). An "other" category was added for sites that could not be categorized according to their scheme.

*Nature of Business.* Three types of businesses were identified in this study: 1) manufactured goods, 2) services, and 3) retail outlets. Manufactured goods were defined as anything tangible produced under one company that resulted in ownership of a product such as Acura cars or Kelloggs' cornflakes. Services were construed to be anything intangible where the process of manufacturing and consumption occur simultaneously such as in the case of restaurants, insurance companies, banks, and so on. Retail outlets were identified as any business activities that involve the sale of different brands of goods and services to consumers for their personal, family, or household use. Examples would be institutions such as Barnes & Noble and Kmart.

### *Dimensions of Interactivity*

Interactivity in web sites is made possible by interactive devices requiring extra programming effort such as chat and games (Wacksman and Cohen, 1997). The interactive device must be made available and visible in a web site. Therefore, the measurement of interactivity of a web site begins with the presence of interactive device for each dimension of interactivity.

1. *Playfulness.* The playfulness of a web site was measured by the presence of curiosity arousal devices and games. Curiosity devices were defined as devices which attract the attention

of visitors and entice their participation during the visit. The question and answer format (Q & A) is an example of a curiosity arousal device because when a company poses questions site visitors can become eager to know the answers and to find out whether or not their answers are correct. Games were anything that must be played by rules and are based on competence or skills to win a prize or scores. In the present study, sweepstakes, which are based on luck, were not considered games.

2. *Choice.* The presence of the choice of color, speed, language, and other aspects of non-informational alternatives were counted as the choice given to the audience. Only choices that provided clear directions on the web page were included in the study.

3. *Connectedness.* An interactive site should provide highly connected information about the product, the company, third-party information, and other information of interest to the visitor. This kind of information interdependency is a unique characteristic of the Web. Hyperlinks, which accommodate this connectedness, were defined as the underlined texts or highlighted items of a web page which when clicked with a mouse will open another web page. Four different types of hyperlinks were considered: 1) self product-related, 2) company related, 3) third-party product-related, and 4) other information. They were either links within the same site or links to other site. Hyperlinks within same site were subdirectories of a home page. These could be read just by scrolling down a page without changing the main URL address. For example, "http//www.directory.net/dir/directory.html" is a hyperlink of the main address, "http//www.directory.net." Repetitive links to the same page were not counted. Hyperlinks to other sites were counted as links to sites that had no relationships to the currently viewed page and having a totally different address. For example, under Rubbermaid's web site at http://www.rubbermaid.com, one can find its division, Littletikes, as the hyperlink. When a visitor

clicks on the hyperlink he/she is transported to "http://www.littletikes.com/."

Integratedness of the hyperlinks was measured by the sum of the presence of 1) self product-related hyperlinks, 2) company hyperlinks, 3) third-party product related hyperlinks, 4) hyperlinks to non-product/company related information and 5) hyperlinks to other sites. Data were coded so that maximum possible score was a five and the minimum score was zero. Highly integrated sites were sites that scored four or above, which meant that they provided interconnected information at least not only from the company itself, but also hyperlinks to third parties to provide additional information to the visitor.

4. *Information Collection*. Information collection was measured by the presence of monitoring mechanisms. Monitoring mechanisms were classified as any explicit means by which a web site operator can record who has visited the site. One common monitoring mechanism is registration at sites (CASIE, 1997). A registration requirement before admitting a visitor to browse a site was considered as monitoring before usage. A request for visitor's information for viewing particular portions of a site was categorized as monitoring during usage. Other monitoring mechanisms that were noted included devices such as counters which displayed the number of visitors to a site or devices through which a visitor could retrieve the traffic flow statistics of that site. However, unobrusive monitoring mechanisms such as cookie files were not measured in this study because Netscape, the most popular browser at the time of the study and used by the coders, could not alert them of the existence of cookie files. Therefore, we should not assume users had the ability to detect cookie files.

5. *Reciprocal Communication*. The reciprocal communication dimension of interactivity was measured in terms of the presence of response mechanisms in a web site. Response mechanisms were any means through which the visitor could communicate with the web site

owner. In this study, five response mechanisms were analyzed: 1) the e-mail address of the webmaster or customer service representative as a hyperlink, 2) provision of a toll free telephone number, 3) order or purchase mechanisms within the site, 4) survey or solicitation of comments from visitors, and 5) other devices through which consumers could respond to the web site owner. Reciprocal communication differs from information collection in that in information collection, the visitor must provide the information either unaware of it (as in unobtrusive cookie files) or they will not get access to a certain portion of the web site as in registration. In reciprocal communication, the visitor can choose to give information and will not lose anything for not providing the information.

Since computer technology develops much faster than any researcher can write, some of the web sites analyzed in this study would have changed their content completely or perished by the time this article is written. This study should be viewed as a benchmark study on the early business web sites. Because this study was unable to randomly select web sites from a nationally representative sample, the results reported here should be considered as preliminary and not conclusive. The present data simply give us broad perspectives about interactivity, serving as examples to measure the different dimensions of interactivity and the limitations of implementing interactivity on the Web for Business purposes. Readers should be cautioned that the low level of interactivity found in some of the web sites may have been improved because of technological advancement. Whether the web site originated from computer engineers, marketing professionals or corporation communications personnel may affect the content of the sites. But this is beyond the scope of this study to examine all of these issues.

*Sampling and Procedures*

The sample was a census of all 110 business web sites listed in the October, 1995, to

January, 1996, archives of the *Web Digest for Marketers* at http://www.advert.com/wdfm/wdfm.html. The time-frame was chosen to represent the early stage of business presence on the Web when the trade press began to regularly devote special section on Web marketing. The *Digest* was the only available list at the time that systematically tabulated business web sites with hyperlinks and brief description of the sites. The *Digest* is an information service provided by an online marketing consultant, Chase Online Marketing. At the time of study, the *Digest* has no vested interest in promoting a particular site. The sites included in the *Digest* were new business web sites of interest to marketers. As this study is exploratory in nature with no claim for generalization, the *Digest* was deemed appropriate to identify business web sites. The archive consisted of weekly web site reviews. Each review listed the URL address of the business site and a brief description of the site. The content analysis was conducted between February 1996 to April 1996. Trained coders were instructed to open the site location from within the archive rather than typing the address separately in order to minimize errors in typing the URL address.

The unit of analysis was the home page because it served as a front door of the entire web site. Usually the home page is named as "index.html", "home.html" or as a default page of the domain name such as "http://www.epson.com." Most visitors of a web site decide whether they would continue to browse the site based on their impressions of its home page. Moreover, web sites vary in size substantially. For example, *Web Techniques* (1997) estimated that web sites range from one page to 50,000 pages. Home pages therefore provided consistency since all units were a single page. Further, coding an entire web site could be extremely time-consuming and introduces biases based on size. Although companies may put their interactive devices not in elsewhere of their web sites, we cannot assume the that visitors have the patience to go through the whole web sites (particularly if they contain over 100 pages). This study analyzes not the whole web site, but the key part of a web site represented by its home page. In analyzing the home page, coders open all the hyperlinks in the forms of underscored texts, icons, or pictures to determine that nature of the hyperlinks. In light of the skills required in using the World Wide Web, seven independent coders already proficient in using the Web were trained to code the web sites over a period of three weeks. Four coders were from a large upper Midwestern state university while the other three were from a Western state university. The quality of collected data could be affected by fatigue and boredom resulted from a high volume of coding tasks. Therefore, each coder was assigned to analyze only a randomly selected list of 20 designated web sites (including two pretest web sites and three post-test web sites).

The pre-test post-test coder reliability testing method used in the James and Vanden Bergh's (1990) study was employed in this study. The seven coders all coded the same pre- and post-test sites. The major investigators randomly selected two web sites (Dunlop and BMW) as pre-test web sites. Three other randomly selected sites (New Balance, Rubbermaid and Epson) were designated as post-test web sites. First, all coders collected data from the two pre-test web sites. These coding sheets were turned in to the principal investigators for quality control analysis. Additional instructions were given to the coders after identifying possible areas of difficulty. All data collectors were instructed to print the home page of the web site before coding it so that if mechanical failure occurred, the coder could continue the coding based on the print out. All the coding were completed within two months after the pretest.

Perreault and Leigh's (1989) Reliability Index was used to compute coder reliability.[1] The advantage of the Perrault and Leigh's (1989) Index is that it does not have a multiplicative chance agreement assumption and explicitly measures the level of agreement that might be expected by a true level of reliability (Perrault & Leigh, 1989). In this study, the pretest coder reliability was .94 for business type, .91 for the presence of games, .91 for the presence of monitoring mechanisms, and .70 for presence of response mechanisms. The post-test coder reliability was generally much higher with .96 for business type, .94 for the presence of games, .87 for the presence of monitoring mechanisms and .64 for the presence of response mechanisms. One possible explanations of the relatively lower coder reliability of response mechanism among the five dimensions is that the response feature is displayed subtly in some web sites which make it to difficult for coders to identify.

## Results

All 110 web sites selected were successfully accessed by the coders although some of them needed a second or a third attempt. Among the sites, 55% were for manufactured goods, 32% were for services, and 14% were for retail outlets. Information sites were the most popular format among business web sites (30%), followed by incentive sites (26.4%), mall sites (14.5%) and online storefront (12.5%). Different business types displayed difference preferences for web site formats. Products (33.3%) and services (31.4%) tended to have a much higher proportion of information site formats than retail outlets (13.3%), while retail outlets appeared most likely to employ a mall format (33.3%). Very few used the web in traditional way of advertising image building that is common in print advertising as shown in the low percentage of image sites (2.7%) and flat ads (2.7%).

### *Playfulness and Freedom in Business Web Sites*

Not many business web sites were playful. Curiosity arousal devices were more commonly used than games to create a playful environment. Almost one quarter of the web sites contained some sort of curiosity arousal devices to attract visitors. Only about one-fifth of the sites contained some sort of games for consumers to play. In terms of *choice*, business web sites generally scored low in providing choices to consumers. Very few sites provided a choice of text or graphics browser, for instance. Color was the most dominant choice feature (43.6%), followed by speed (14.5%). The least common choice offered to visitors was language (9.1%).

*Connectedness in Business Web Sites*

One interactive device unique to the Web is hyperlinks. Even though many business web sites analyzed in this study contained more than 13 non-repetitive hyperlinks just in their home pages; when the nature of the links was further investigated, most of them were self-promotional. Links within the same sites were highest in number (mean=12), followed by links about the product/service itself (mean=5), and links about the company (mean=3). Links to third-party information about the product and other information were very rare with no more than two links per site on average.

*Information Collection in Business Web Sites*

Both integrated marketing communication and database marketing require rigorous consumer information collection. Although they are increasingly popular as marketing practices, our study found that 81% of the web sites had no explicit monitoring device at all. Eighty-six percent of the web sites had no registration procedure. Among those that used a registration procedure, registration before visits were two times more frequently required than registration during visits. The higher occurrence of registration before a visit was indeed expected because after admission to a site, consumers have little incentive to reveal their identity or disclose other information. Therefore, high levels of interactivity in terms of information collection, occurred mostly before a web site visit.

*Reciprocal Communication in Business Web Sites*

Despite the ease with which a web site can be used as a two-way communication tool between the company and the visitor, this study found that 38.2% of web sites had no explicitly displayed consumer reciprocal communication devices. Among those that provided consumer reciprocal mechanisms, the most commonly used device was the e-mail option. Not many companies saw their web sites as direct marketing tools. Only 24.5% provided a typical toll free number for ordering or inquiry. Some 22.7% had order mechanisms on the web. Cross-media reference was seldom used. Surveys about consumers were not very common as only 11% of web sites ask consumers to fill out a survey for them in the home page. Among the few web sites that used other response mechanisms, they either asked visitor for specific information or provided some kind of online chat devices such as the Hyundai World Cup in Korea site's "fanletter" and Prudential's "communication e-mail" to other Prudential customers listed in the site.

Overall, interactivity in business web sites was quite low as shown in Table 1. Among the web sites considered in this study, the interactivity dimension that was most prevalent was allowing consumers to choose. Still, this was only typical of only one half of the web sites. The other one half of web sites did not provide such choices. Consumer feedback or response, the foundation element for reciprocal communication dimension of interactivity, was only moderately used in the web sites. Almost two-thirds of the web sites did not provide any reciprocal communication device.

To understand how different types of businesses fared on interactivity, an interactivity score was computed for each web site by summing the presence of games and curosity arousal devices (playfulness), choice, highly integrated hyperlinks (connectedness), monitoring devices (information collection) and response devices (reciprocal communication). One-way ANOVA was used to determine if the differences in the interactivity scores of the web sites of manufactured goods, services, and retail outlets are significant. The results show that the three types of businesses were similar to one another in entertaining and engaging consumers as no significant differences were found between the sites in their playfulness and choice dimensions. Yet, products, services, and retail outlets differed significantly on *connectedness*, *information collection* and *reciprocal communication* dimensions of interactivity. Namely, manufactured goods (mean = .26) were more likely than retail outlets (mean= .20) and services (mean = .06). to contain monitoring devices ($F = 3.25$, $p < 0.05$). Manufactured goods (mean=.72) also were more likely than retail outlets (mean = .67) and services (mean = .46) to contain response devices ($F = 3.1$ , $p < 0.05$) Manufactured goods had better integration of hyperlinks (mean= 3.35)than retail outlets (mean=2.73)and services (mean=2.86).

## Discussion

Unlike the traditional assumption of interactivity as a two-way communication, this study's five-dimensional view of interactivity accommodates the diversity of personality and usage of the Web. For self-indulgers and web surfers, the playfulness and choice dimensions of interactivity fulfill their self-communication and entertainment needs. For task-oriented web users, the connectedness dimension can fulfill their information needs. For expressive users, the information collection and reciprocal dimension of interactivity allow them to initiate communication with the web site representatives or people of common interest online. In this study, the generally low use of interactive devices reveals a discrepancy between the interactive capability of the medium and the actual implementation of interactivity in a business setting. The audience-oriented dimension of interactivity was given much more attention than other dimensions of interactivity between the company and the consumer.

The most prevalent dimension of interactivity in business web sites was reciprocal communication (61.2%). The next most frequently found dimension of interactivity is the availability of choices (52.7%). The prevalence of the reciprocal communication dimension can be attributed to the common presence of e-mail addresses in web sites. However, it is not known from this study how businesses respond to the e-mails posted by the visitors. The choice in business web sites is only a false sense of empowerment because the consumer's choice is still defined by the company. The company determines what choices will be given to consumers who then make use of the choices given by the company. The choices given to visitors according to this study was mostly of color to display on computer screen, a product-based choice or visual preference choice, rather than choices that could appeal to a more diverse audience, such as language choice and browser choices. Language choice could attract different ethnic groups and nationalities while browser choice could serve users with different computer equipment.

When we examine the hypertext links that were used by the business web sites in the study, many web sites were not well integrated in terms of their hyperlinks. Third-party information, either about the product or other relevant information, was very rarely found in web sites. The connectedness dimension of interactivity was also an illusion in business web sites. Most companies only wanted to confine their visitors to their own connected world and not other third-party sources. Web sites, therefore, tended to shield consumers from information from other sources by controlling the extent to which they facilitates consumers' exposure to competing and conflicting messages.

If we treat communication between consumers and a company as the highest level of interactivity, then this study shows that manufactured goods and retail outlets do generally want to interact with consumers more than service providers. The reason why goods and retail outlets exhibit similar levels of response mechanisms and monitoring mechanisms may be explained by the difference in consumer decision-making processes between manufactured goods and services. Consumers can easily make a purchase decision about goods from a web page because goods are tangible and objective. Verifiable information could be obtained to help reduce perceived risks. Consumers could immediately inquire about the goods being offered and use the response mechanisms provided in the site. Services may be much more difficult for the consumer to evaluate based on web page information alone. The web site in this instance serves more as a showcase of the accomplishment of a service company rather than a business transaction device. Even with this rationale, by using few response and monitoring mechanisms, services have failed to capitalize on the power of the Web to generate sales leads and inquiries.

The low usage of explicit monitoring device across all business types is another major finding of this study. This phenomenon may be explained by the technical limitations of developers of these web sites who may lack the knowledge about web traffic log analysis tools, or by the unwillingness of companies to spend the money hiring a traffic audit service. Unobtrusive monitoring device can only obtain information on physical response of the visitor, important demographic and psychographic information is not available without non-obtrusive monitoring devices. Another possible explanation for the low usage of explicit monitoring devices could be a response to the concern about the privacy expressed by many web consumers. In fact this concern has caused many visitors entering false information during site registration (GVU's 7th WWW User Survey, 1997). Maybe companies do not want to scare visitor away with monitoring devices such as visitor registration. To enhance reciprocal communication and information collection, a company must gain the trust of visitors. Companies could give assurance to visitors such as promising that the collected data will not be misused and simplify the data collection procedures.

One may wonder if the proposed five-dimensions of interactivity are also applicable to traditional media. Theoretically, these five dimensions of interactivity can be applied to traditional media. For example, TV can accomplish the playfulness dimension of interactivity with its audience such as the CNN news trivia. Nevertheless, traditional media have a lot of physical and technical constraints that make it difficult to achieve the five-dimensional interactivity with the same efficiency as the Web. For example, the production cost, physical space requirement, and weight of printed paper will make the connectedness dimension difficult to achieve in print media. It requires a lot of effort from the reader to cross-reference the materials even if it is well-indexed and contained in one book because the reader has to flip through pages to find it. The bandwidth limitation, production cost and technical skills required to produce and store TV programs and signals make it almost impossible to do any kind of real reciprocal communication and information collection. In many cases, when traditional media need to interact with audience, they need cross-media support such as telephone and mail. A much longer time-frame than the Web is required to achieve interactivity in traditional media. On the web, the seemingly difficult interactive tasks in traditional media disappear with the ease to retrieve, copy and distribute files through cyberspace. Every interactive features can be accomplished at the fingertips of the computer user through the click of a mouse.

## Suggestions for Future Research

The transient nature of the web medium make it necessary to employ a longitudinal perspective to study the evolution of web sites. The current study is a snapshot of the interactivity of the web at its early stages. Moreover, web site executives should be interviewed to understand whether the issue of low interactivity is caused by a lack of technological knowhow or a deliberate strategy to maintain a low interactivity level between the company and the consumers.

Finally, researchers should explore the site visit experience of consumers. Are consumers aware of the interactive features in a web site and do they like these features? Do they appreciate more on audience-oriented dimension of interactivity than source-oriented dimension of interactvity? How do they determine whether they will use or not use the interactive devices during visits? What are the effects of the interactive devices on the web site visitor's product knowledge, consumption experience and purchase behavior? Cultural differences may account for different content and interactive devices found on the web. Companies must not lose sight of the fact that the Web is indeed a worldwide web. Future studies can compare web sites originating in different countries to account for the role of cultural difference in determining the interactivity of web communication.

Table 1

Dimensions of Interactivity of Commerical Web Sites

| Interactivity Dimension | Percentage of sites (n = 110) |
|---|---|
| 1. Choice | 52.7% |
| 2. Playfulness | 19.1% |
| 3. Connectness: Integrated hyperlinks (score 4 or 5) | 37% |
| 4. Information collection: Presence of monitoring mechanisms | 19.1% |
| 5. Reciprocal communication: Presence of response mechanism | 61.8% |

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# Endnote

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[1] Perreault and Leigh's (1989) Reliability Index (Ir)

$$Ir = \{[(Fo/N)-(1-k)][k/(k-1)]\}^{.5}$$

where Fo = Number of judgments on which the judges agree
N = Total number of judgments made by each judge
k = Number of categories

# NEWSPAPER SIZE AS A FACTOR IN USE OF COMPUTER-ASSISTED REPORTING

Bruce Garrison, professor
School of Communication, University of Miami
P.O. Box 248127, Coral Gables, FL 33124-2030
305-284-2846 (voice), 305-284-3648 (fax)
bgarriso@umiami.ir.miami.edu

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# NEWSPAPER SIZE AS A FACTOR IN USE OF COMPUTER-ASSISTED REPORTING

## ABSTRACT

This paper investigates the role of newspaper circulation as a factor in use of computer-assisted reporting resources by U.S. daily newspapers in 1997. The study analyzes the relationships between newspaper size and general computer use in newsgathering, the number of staff people involved in computer-assisted reporting, availability of training programs, use of portable computing, use of online research services, online spending, and existence of World Wide Web sites. The study found support for five of seven hypotheses and partial support for a sixth hypothesis, suggesting that larger newspapers have a distinct advantage in computer use in newsgathering.

# NEWSPAPER SIZE AS A FACTOR IN USE OF COMPUTER-ASSISTED REPORTING

The growing form of newsgathering commonly known as computer-assisted reporting is experiencing change. At the time that Philip Meyer (1973, 1979) introduced the term "precision journalism," only large daily newspapers with access to mainframe computer systems, sufficient budgets to purchase databases, and the requisite computer programming expertise regularly used computers for newsgathering. Even nearly a decade later, when Demers and Nichols (1987) offered their view of precision journalism, it remained a tool of larger newspapers with time and resources to tackle computer-oriented database projects. When Meyer (1991) revisited precision journalism at the beginning of this decade, change was beginning to occur in use of computers in journalism. In the 1990s, using precision methods in newsgathering evolved with the new, more powerful tools. The process has become known as computer-assisted reporting and journalists are using rapidly improving personal computers.

Originally a specialty approach reserved for investigative reporters and a few other specialists in the newsroom, computer-assisted reporting has moved toward wider use in newsrooms (Ciotta, 1996; Garrison, 1996). In some newsrooms in 1998, computer-assisted reporting has become integrated into the newsroom and its tools have become part of all reporters' approaches to their assignments (Garrison, 1998). The new digital forms of newsgathering are changing, even reshaping the basics of journalism (Moeller, 1995; Garrison, 1997). In other newsrooms, the transition occurs when new computers and newsroom

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networks are installed to replace limited-task centralized computer systems originally designed for writing, editing, and production. Usually, re-computerization of a newsroom occurs because of desire to increase productivity or to save money. Rarely do editors and publishers upgrade technologies to increase quality or to compete (Brooks & Yang, 1993).

The purpose of this study was to determine the impact of the circulation size of a newspaper on its use of computers in newsgathering. Research has shown that newspaper size is associated with development of new resources in newsrooms (Splichal, 1993; Garrison, 1996). Large metropolitan dailies were among the first newspapers to use online research tools such as Lexis/Nexis and to build their own in-house database archives that were accessible online (DeFleur, 1997). Splichal (1993) studied 42 Florida daily newspapers and found computerized public records were more likely to be used by large newspapers than small newspapers. That use, he observed, was often more sophisticated as well. He also found that larger newspapers used more advanced computer systems for online access and transfer of public information. Smaller newspapers, he said, depended much more on paper copies of records than on digital forms such as tape or diskette. Friend (1994) found that almost all editors recognized the value of computers and their analytical potential and, if they were not using online tools at the time of her study, would soon begin. She also determined a shift from special project applications of CAR to more daily and routine types of reporting. This was leading to a wider range of data sources and story subjects.

In their national study of the impact of computerization on newspaper newsrooms that occurred at the beginning of growth period for computer-assisted reporting, Brooks and Yang (1993) determined that "small newspapers lag far behind their large and medium-size ones in newsroom computerization. While small papers may do word processing on computers, the equipment is used for little else..." (p. 16). They found differences in the length of time computers have been in the newsroom, amount of hardware and software resources, training, advanced applications of computing for reporting, and general use of CAR. They were able to associate newspaper circulation, staff size, database use, use of CAR, and the total number of computer functions to such things as use of databases.

Technology is the heart of most industries today, particularly the information industries. No information industry is more dependent on technology than newspapers, Lacy and Simon (1993) argue. They observe that some of the effects of technological changes embraced by newspapers have been intended, but others were unanticipated. Lacy and Simon note that there are numerous factors that affect adoption of new technology, including cost, existing investments in equipment, the business's market and competition, and ownership type. The pattern of adoption of technology generally follows variations of the classic "S" pattern of diffusion of innovations, they stated, with few companies investing in new technologies when prices are high at introduction (Lacy & Simon, 1993; Rogers, 1995). After a slow start, adoption accelerates and then levels off as all users eventually adopt. Early adopters, they note, are companies with resources that can afford investment risks. In the newspaper business, these are usually large newspapers or groups or small or medium-size newspapers.

Larger newspapers have been regarded as resource rich compared to smaller newspapers (Gladney, 1990). This, in general, means more staff, more equipment, larger budgets, greater expertise, higher salaries, greater autonomy, more specialization, more experience, and prestige among the advantages (Demers, 1994). It also means a greater willingness to try and adopt new technologies. Larger news organizations are better equipped to adapt and survive in a rapidly changing environment (Demers, 1994). Large news organizations that are parts of groups are, perhaps, even better prepared in terms of financial and management resources (Busterna, Hansen, & Ward, 1991). Lacy and Fico (1991) found that there is a strong relationship between the amount of newspaper circulation and editorial quality.

In terms of computer-assisted reporting, availability of resources has usually meant availability of money and people that can acquire and use computer hardware, software, and databases (Houston, 1996; Brooks & Yang, 1993; Martin, 1994). It has also meant availability of expertise in use of the computer resources as well as in areas of reporting (DeFleur, 1997; Martin, 1994). Furthermore, larger newspapers have "deep pockets" to purchase new equipment as it is introduced, to test new products, to hire consultants or new full-time staff members to fill expertise voids, and to pay for expensive databases or pay-as-you-go online resources (Garrison, 1996; Martin, 1994; Brooks & Yang, 1993). "Some [small newspapers] may use their small size and relative lack of resources as an excuse not to hire competent news professionals or provide adequate newsroom budgets," wrote researcher George Gladney (1990, p. 70).

Use of computing tools in businesses such as newspapers may not be a function of size, other analysts have noted. For example, businesses and governments of all sizes use the most common database tools such as spreadsheets and relational database management systems in their daily activities (Houston, 1996). It is also commonly thought that computerization leads to reduction in jobs and downsizing in some industries such as manufacturing. While computerization had a similar effect when newspapers first added computers for production (Garrison, 1980), this may not be the case for computerization in newsgathering. Within journalism, there is a school of thought that computers may have a different impact in the newsgathering process. For example, newspapers have created positions and added specialists in computer-assisted reporting instead of reducing staff size (Ciotta, 1996).

Often, small newspaper journalists have stated that these tools help them to be competitive with their neighboring metro dailies (Walsh, 1995; Kohlstrand, 1995; Napolitano, 1995). With the relative low cost of personal computers, there is an incentive for smaller news organizations to use them in newsgathering, because of the obvious savings in time and travel costs, among other, more journalistic reasons. Davenport, Fico, and Weinstock (1996) found that more than half of the newspapers they studied in Michigan that had adopted online research or other computer-assisted reporting approaches were small newspapers with less than 50,000 circulation. This suggested "that this trend is hardly confined to just the biggest and richest news organizations," they concluded (p. 26).

Small newspapers have typically been less bound by structure and are more innovative in use of resources and fewer rules and regulations for use of those resources (Demers, 1994). They tend to be staffed by younger, more computer-oriented staff members. They have been leaders in adoption of some personal computer-based technologies in the newsroom, especially those related to typesetting, pagination, and other aspects of production because they have not been bound to large, centralized computing systems (Aumente, 1989). Small newspapers also have been found to approach quality issues differently from their larger counterparts, largely because of their limited resources (Gladney, 1990).

Some authorities have argued that computer-based news reporting tools have "leveled the playing field" when it comes to coverage of communities (Feola, 1993; Miller, 1997). These proponents have argued that even the smallest of news organizations can use these tools in an effective manner and compete at advanced levels for news with their larger neighbors. Former *Waterbury Republican-American* news systems editor Chris Feola recently wrote: "[T]he 60,000-circulation Connecticut paper where I work isn't among the nation's dominant dailies. But that's just the point: It demonstrates that far from being the exclusive province of big-city outlets, computer-assisted reporting has finally allowed small players to compete in the big leagues (Feola, 1993, p. 26). In her overview of computer-assisted reporting, Miller (1997) demonstrates the wide appeal of computers in newsgathering, especially with smaller news organizations, by offering a wide range of examples of stories and projects from small and medium-sized dailies.

The literature tends to suggest that large newspapers have an advantage and will use computer-assisted reporting more than small newspapers even though there is some discussion of a "leveling" effect. Because there are numerous aspects of computer-assisted reporting to consider, the focus of this paper is to summarize findings of exploratory research involving seven variable sets— the impact of circulation size on use, staff, training, portability, online access, online spending, and online news distribution (Garrison, 1995; DeFleur, 1997). Therefore, it is hypothesized that:

$H_1$—Large daily newspapers will have a larger proportion of general computer use for newsgathering than small daily newspapers.

$H_2$—Large daily newspapers will use more total individuals assigned to CAR work than small daily newspapers.

$H_3$—Large daily newspapers will have a greater proportion of CAR training programs available to staff than small daily newspapers.

$H_4$—Large daily newspapers will use more portable computing resources for CAR than small daily newspapers.

$H_{5a}$—Large daily newspapers will use more expensive online resources than small daily newspapers.
$H_{5b}$—Large daily newspapers will use fewer inexpensive online resources than small daily newspapers.
$H_{5c}$—Large daily newspapers will use more total online resources than small daily newspapers.

$H_6$—Large daily newspapers budget more money for online resources than small daily newspapers.

$H_7$—Large daily newspapers will host a World Wide Web site more often than small daily newspapers.

## STUDY METHODS

To test these hypotheses, a national mail survey was conducted. In January 1997, self-administered questionnaires were mailed with postage-paid return envelopes to the computer-assisted reporting supervisor, managing editor, or executive editor at 510 daily newspapers with circulation 20,000 or more copies on Sundays. Circulation figures were based upon those reported in the 1997 edition of the *Editor & Publisher International Year Book* (Editor & Publisher, 1997). No sampling frame was used because the study group constituted the entire population. A larger population, including newspapers with circulation less than 20,000 daily, could not be included because of budget limitations. It was also believed that, from earlier research described above, very small newspapers were less likely to be using computer-based information gathering and analysis tools than their larger counterparts. Questionnaires were developed from interviews with journalists and from group discussions at national conferences focusing on investigative reporting, computer-assisted reporting, and news research.[1]

When sent to a general editor, recipients were asked to respond or to forward the questionnaire to individuals in their newsroom who were most qualified to respond. This resulted in a mix of specialists serving as respondents, including reporters, investigative reporters, CAR specialists, news librarians, news researchers, and editors. Two follow-up mailings— one in February 1997 and one in March 1997— were used to increase the response rate. A total of 226 usable questionnaires were returned, a 44.3% response rate. Response patterns represent all regions of the country. The mean weekday circulation was 100,431 copies (SD=130,674). Respondent newspaper demographics were consistent with other similar studies conducted during the previous three years (Garrison, 1998).

The circulation size of the newspaper was recorded as the weekday circulation reported on the questionnaire by each respondent newspaper. Circulation ranged from 10,000 to 1 million with a mode of 40,000. For this study, the median circulation was 50,000 and it was used to divide the newspapers into two groups of "smaller" (50,000 or less, n=113) and "larger" (more than 50,000, n=113) circulation. The Statistical Package for the Social Sciences for Windows, Ver. 8.0.0, was used to analyze data (SPSS, Inc., 1998). Martin (1994), who studied online research approaches of small dailies, also used 50,000 as the dividing point in defining small and large newspapers.

General use of computers was defined as use for newsgathering beyond basic word processing and other production-oriented tasks. The total number of individuals involved in computer-assisted reporting was operationalized as reporters, editors, librarians, and other full-time equivalent news personnel involved in CAR work on a regular basis. The simple existence or non-existence of a training program of any type defined the training variable. This included both internal and external training programs. Respondents were also asked whether reporters and editors used portable computers, such as laptop and notebook PCs, when reporting from the field. This defined the portable variable.

The three "expensive" online resources variables were operationalized as those with hourly fees or high flat-rate fees. The two "inexpensive" services variables, in contrast, were those offering low, or less than $30 per month, flat-rate subscriptions. For this study, the three expensive services included Lexis-Nexis, Database Technologies' Autotrack Plus, and Dow Jones News Service. The two inexpensive services were America Online and CompuServe. The variable representing the total number of online services used was operationalized as the total number of online services the newspaper "regularly uses" reported from a list of 21 named online resources.[2] Respondents were also asked to report the total amount of money budgeted for use of online services in 1997. Finally, respondents also were asked whether their newspapers had a World Wide Web site.

## FINDINGS

For newspapers, computer use in newsgathering has grown steadily in the past four years. The mean circulation was 100,431 and respondents were geographically distributed around the country (20% in the East, 34% in the South, 27% in the Midwest, and 20% in the West). The type of newsroom role held by respondents also varied (42% were editors or supervisors, 27% CAR supervisors, and 31% held other roles). Most findings reported here represent high points in the use of computing as a newsgathering tool (Garrison, March, 1998). The increasing use has occurred at several levels that will be discussed below.

### Hypothesis 1— General computer use

The hypothesis that large newspapers will generally use computers more than small newspapers is supported. Data in Table 1 show large newspapers generally use computers more often than small newspapers for newsgathering. Almost 95% of large newspapers used computers in 1997 while 81% of small dailies did. The Chi-square test of the difference was statistically significant at the $p<.01$ level.

### Hypothesis 2— Number of individuals involved in CAR

The hypothesis that large newspapers have more individuals involved in CAR is supported. Data in Table 2 indicate a statistically significant difference in the means of the large and small newspaper groups. The large newspapers reported a mean of 11.01 (SD=19.22) full-time persons compared to a mean of 3.99 (SD=4.80) persons for small newspapers. The t-test of the mean difference was significant at the p<.001 level (two-tailed test of significance). Daily circulation and the number of individuals involved in CAR correlated at the +.249 level (n=183). The Pearson correlation coefficient was statistically significant at the p<.01 level (two-tailed test of significance).

### Hypothesis 3— CAR training programs

The hypothesis that training would be more common at large newspapers is supported. Data in Table 3 show that large newspapers have an important advantage in computer training. Almost 72% of large newspapers provided some type of training, while almost 35% of small newspapers did. The Chi-square test of the difference was significant at the p<.001 level.

### Hypothesis 4— Portable computing

The hypothesis that large newspapers would use portable computing more than small newspapers is not supported. Data in Table 3 demonstrate there are almost equal levels of use of portable computing at large and small newspapers. A total of 90.0% of large newspapers use portable computers, but a total of 87.4% of small newspapers also used them. The Chi-square test of the difference was statistically insignificant and the hypothesis is refuted.

**Hypothesis 5— Online resources**

This group of hypotheses relating to use of online newsgathering resources yielded mixed support. Data in Table 4 show all five measures indicate significant differences in large and small newspapers' use of online news research tools. Hypothesis 5a predicted that large newspapers would use expensive online services more than small newspapers. Among the three measures of expensive services, there is clearly greater use by large daily newspapers. While almost half (47.8%) of large newspapers used Lexis-Nexis, few (3.5%) small newspapers did. For Database Technologies' Autotrack Plus, 82.6% of large dailies used it, but only 17.4% of small dailies had access in 1997. The third expensive service, Dow Jones, was used by 28.3% of large dailies and by just 2.7% of small dailies. The Chi-square tests of these differences were in the hypothesized direction and each was statistically significant at the p<.001 level.

Hypothesis 5b predicted that larger newspapers would use inexpensive online services less often than small newspapers. In terms of the two inexpensive online services, there was an increase in use by small newspapers, but not more use than large newspapers. However, a larger number of large newspapers used both of the inexpensive services than did small newspapers and this hypothesis is not supported. A total of 54.0% of large dailies reported using America Online, while 31.0% did. For CompuServe, 34.5% of large dailies reported using this service, but 18.6% of small dailies used the service. The Chi-square tests of the differences were each statistically significant at the p<.01 level, but not in the hypothesized direction.

Hypothesis 5c predicted that large newspapers would use more total online resources than small newspapers. The number of online resources ranged from zero to as many as 15 (Fort Lauderdale *Sun-Sentinel*) of the 21 listed services. For both groups, the mode was 2.0 services, median 3.0, and mean was 4.0 services per newspaper. A total of 73.5% of the respondent newspapers used five or fewer online services. As shown in Table 2, the t-test of the mean differences in the number of online services in use by large dailies (5.57, SD=3.10) was statistically significant from that of the mean of small dailies (2.43, SD=1.77), p<.001 (two-tailed test). Daily circulation and the number of online services used correlated at the +.636 level (n=226). The Pearson correlation coefficient was statistically significant at the p=.01 level for a two-tailed test.

## Hypothesis 6—Spending on online services

The hypothesis that large newspapers spent more on online services is supported. Data in Table 2 show a vast difference in annual spending levels in 1997. Large dailies spent a mean of $27,622 (SD=$52,407) on online services, but small dailies could afford to spend only a mean of $2,137.32 (SD=$4,286). The t-test of mean differences was significant at the p<.01 level (two-tailed test). Daily circulation and spending in 1997 for online services correlated at the +.829 level (n=78). The Pearson correlation coefficient was statistically significant at the p=.01 level for a two-tailed test.

## Hypothesis 7— World Wide Web sites

The hypothesis that more large newspapers than small newspapers would have World Wide Web sites is supported. As shown in Table 5, a total of 76.1% (n=86) of large dailies had their own World Wide Web sites, but only 58.4% (n=66) of small dailies had some presence on the Web. The Chi-square test of the difference was statistically significant (p<.01).

## CONCLUSIONS

There is an element of common sense in the findings of this study. However, this does not undermine the importance of these results. Individuals familiar with the newspaper industry and the newsgathering culture of newsrooms may reach the same conclusions as described here without the research evidence. However, there are numerous subtleties involved in stating simply that larger daily newspapers with more resources will use computers in newsgathering more extensively and in a more sophisticated manner. This is the common sense dimension of the study.

There is much more to the issue. This study analyzed the finer points of the influences of these more extensive resources in terms of how computers are being used for newsgathering. There are significant differences in all areas studied— in general use of computers in newsgathering, in terms of the number of individuals assigned to work with computers in their reporting, in the existence of CAR training programs of any form or type, in the use of both expensive and inexpensive types of online resources, in the amount of money spent on online services, and in the existence of World Wide Web sites.

The only area in which there was no difference found was in the use of portable computing tools such as laptop and notebook computers. This is an interesting finding in that portable personal computers are more expensive, more fragile, and, in some cases, less powerful than their desktop counterparts. The finding may be due to the fact that not everyone in the newsroom uses portable computers and there are fewer in use at smaller newspapers, but they are still used. Perhaps a better measure of this variable would have reflected the number of portables in use instead of the simple use or non-use of this type of personal computer.

A number of studies and commentaries by experts in the literature suggested that use by small publications might equal that of large publications (Walsh, 1995; Kohlstrand, 1995; Napolitano, 1995). While longitudinal data are needed for conclusive evidence, the "leveling" in terms of newsgathering does not seem apparent from the data in this study. However, there is use by small publications in some places across the nation and growth of use will likely continue in the manner of the classic "S" model of adoption of innovation (Lacy & Simon, 1993; Rogers, 1995). Small newspapers are, apparently, those adopters in the middle or top half of the "S" that begin to use new technologies later, rather than sooner, in the process.

The study has several weaknesses. Circulation is only one measure of the size of a newspaper, for example. There are other ways to view and analyze size, such as the market served, number of journalists on staff, number of specialists involved in CAR, number of editions, space devoted to news, and so forth.

Perhaps a major unanswered question involves whether there are other variables that may help us understand use of computers in newsgathering and news analysis. Measurement of the variables used should be refined and several other variables should be added. For example, it would be useful to know the entire news-editorial staff size of each newspaper in addition to the number of individuals involved in CAR. This would permit calculation of proportion of staff devoted to CAR. There may be differences in large and small newspapers in that variable. Further, there may be subtle differences in size groupings that the large-small dichotomy does not reveal. For example, there may be usage differences in very large newspapers that are different from medium-sized or smaller ones.

Longitudinal analysis of data would have permitted study of the "leveling" theory offered by some researchers and practitioners. This remains a prospect for additional research. It is clear that the study needs to reach further. There are other elements of computer-assisted reporting that have not been addressed in this analysis. For example, the study does not analyze the types of hardware and software in use, newspaper ownership type, levels of computer expertise or computer literacy, and the approach taken toward integrating CAR into the newsroom. Another area of interest is the impact of such technology on content. For example, it would be useful to study whether there are differences in the types of stories being done that varies according to the size of the newspaper. It is also possible that large newspapers take on stories of larger scope, greater depth, and larger databases. Or, it could be that small newspapers tend to use computer resources for local or community-oriented stories instead of state, regional, or national views. This study has been exploratory in several ways, but its conclusion that newspaper size matters in use of computers in newsgathering is useful toward understanding how computer-assisted reporting fits into the practice of contemporary journalism.

## FOOTNOTES

[1] National conventions included those of the Investigative Reporters and Editors (IRE), National Institute for Computer-Assisted Reporting (NICAR), the Special Libraries Association (SLA), and Society of Professional Journalists (SPJ) during 1994-97. Copies of the questionnaire may be obtained from the author or from the University of Miami CAR Research Project World Wide Web site at http://www.miami.edu/com/car/index.htm.

[2] The listed services were America Online, Autotrack Plus (DBT), bulletin board services, CompuServe, DataTimes, Dialog/Knowledge Index, Dow Jones News/Retrieval, Delphi, FedWorld, GEnie, Information America, Lexis/Nexis, local government online, Microsoft Network, NewsNet, PACER, Prodigy, credit information services, U.S. Datalink, Westlaw, and the World Wide Web/Internet.

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### TABLE 1
### COMPUTER USE IN NEWSGATHERING

| | Large newspapers | | Small newspapers | |
|---|---|---|---|---|
| Yes | 107 | 94.7% | 92 | 81.4% |
| No | 4 | 3.5 | 20 | 17.7 |
| Don't know | 2 | 1.8 | 1 | 0.9 |

n=226, $X^2$=12.131, df=2, p=.002.

### TABLE 2
### PERSONNEL AND ONLINE SERVICES MEANS COMPARISONS

| | Large newspapers | Small newspapers |
|---|---|---|
| Mean full-time equivalent individuals<br>n=183, t=3.226, p=.001. | 11.01 (n=101) | 3.99 (n=82) |
| Mean number of online services used<br>n=226, t=9.341, p=.000. | 5.57 (n=113) | 2.43 (n=113) |
| Mean online spending in 1997<br>n=78, t=3.104, p=.003. | $27,622 (n=37) | $2,137 (n=41) |

### TABLE 3
### USE OF TRAINING PROGRAMS, PORTABLE COMPUTERS

| | Large newspapers | | Small newspapers | |
|---|---|---|---|---|
| TRAINING | | | | |
| Yes | 78 | 71.6% | 38 | 34.9% |
| No | 31 | 28.4 | 70 | 64.2 |
| Don't know | 0 | 0.0 | 1 | 0.9 |
| n=218, $X^2$=29.853, df=2, p=.000. | | | | |
| PORTABLE COMPUTERS | | | | |
| Yes | 99 | 90.0% | 97 | 87.4% |
| No | 10 | 9.1 | 14 | 12.6 |
| Don't know | 1 | 0.9 | 0 | 0.0 |
| n=221, $X^2$=1.683, df=2, p=.431. | | | | |

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### TABLE 4
### USE OF ONLINE SERVICES

| | Large newspapers | | Small newspapers | |
|---|---|---|---|---|
| LEXIS-NEXIS | | | | |
| Yes | 54 | 47.8% | 4 | 3.5% |
| No | 59 | 52.2 | 109 | 96.5 |
| n=226, $X^2$=57.984, df=1, p=.000. | | | | |
| AUTOTRACK | | | | |
| Yes | 38 | 33.6% | 8 | 7.1% |
| No | 75 | 66.4 | 105 | 92.9 |
| n=226, $X^2$=24.565, df=1, p=.000. | | | | |
| DOW JONES NEWS | | | | |
| Yes | 32 | 28.3% | 3 | 2.7% |
| No | 81 | 71.7 | 110 | 97.3 |
| n=226, $X^2$=28.432, df=1, p=.000. | | | | |
| AMERICA ONLINE | | | | |
| Yes | 61 | 54.0% | 35 | 31.0% |
| No | 52 | 46.0 | 78 | 69.0 |
| n=226, $X^2$=12.242, df=1, p=.000. | | | | |
| COMPUSERVE | | | | |
| Yes | 39 | 34.5% | 21 | 18.6% |
| No | 74 | 65.5 | 92 | 81.4 |
| n=226, $X^2$=7.352, df=1, p=.007. | | | | |

### TABLE 5
### USE OF WORLD WIDE WEB SITES

| | Large newspapers | | Small newspapers | |
|---|---|---|---|---|
| Yes | 86 | 76.1% | 66 | 58.4% |
| No | 27 | 23.9 | 47 | 41.6 |
| Don't know | 0 | 0.0 | 0 | 0.0 |

n=226, $X^2$=8.037, df=1, p<.01.

# The Rural-Urban Gap in Community Newspaper Editors' Use of Information Technologies

Douglas Blanks Hindman
Department of Communication
North Dakota State University
P.O. Box 5075
Fargo, ND 58105-5075
dhindman@badlands.nodak.edu
(701) 231-7300

Stan Ernst
Department of Agriculture Communication
North Dakota State University

Mavis Richardson
Department of Communication
North Dakota State University

Paper presented at the August, 1998, meeting of the Association for Education in Journalism and Mass Communication, Baltimore, MD.

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# The Rural-Urban Gap in Community Newspaper Editors' Use of Information Technologies

## Abstract

This paper is an exploration of community newspaper editors' use of two types of information technologies that are a) compatible with, and b) incompatible with the routine production of the newspaper. Findings were that indicators of social status were closely associated with editor's use of incompatible technologies. Nationally, gaps between rural and urban communities with on-line newspapers appear to be widening.

# The Rural-Urban Gap in Community Newspaper Editors' Use of Information Technologies

Information technologies are often discussed in terms of their potential to either widen or narrow gaps in knowledge and power between higher and lower status segments of society (Ettema, 1984; Katzman, 1974; Rogers, 1986; Scherer, 1989). Similarly, information technologies are often discussed in terms of the potential to either exacerbate or eliminate geographic inequities between urban and distant rural communities (Gillespie & Robins, 1989; Hudson & Parker, 1990). The existence of inequities in the availability and use of information technologies is particularly important in a society in which knowledge is increasingly tied to profits and power (Bell, 1976; Tichenor, Donohue, & Olien, 1970).

This is an exploratory study of the social context in which editors use different types of information technologies. Of primary interest is the use of information technologies by editors of newspapers in homogenous rural communities, and by editors in more pluralistic, urban communities. Editor's use of two main types of technologies were also explored: technologies used in the routine production of the newspaper, and technology used to transform the newspaper into an on-line version. The two types of technology explored in this study correspond with what Rogers (1983) defined as compatible and incompatible innovations. Compatibility is defined as the degree to which an innovation is perceived as consistent with the values, experiences, and needs of adopters (p. 223).

## Information technology use by journalists

Recent studies of the use of information technologies by journalists show widespread adoption and increasing levels of use. In a September, 1997, mail survey of magazine and newspaper editors and broadcast news managers, 93% of respondents said they or their staffs use on-line services at least occasionally. Almost half the respondents say they or their staff go on-line every day, and 55% of respondents say their publication, or portions of it, are on-line (Ross & Middleberg, 1997). Niekamp (1997) showed that television web sites with links within news stories tended to receive greater use than other types of interactive content. Redmond (1996) examined 1500 television and radio web sites showed that radio and TV stations were providing very limited community service information on their web sites beyond self-promotion. In contrast, Grubman and Greer (1997) showed that the 89% of the sample of newspaper web pages included local news, but only 15.7% of the newspapers adopted their writing style to fit the medium by including linked boxes or non-traditional storytelling.

In one of the few studies that examine the social context of technology use, Grubman and Greer (1997) found that larger newspapers' on-line products had more extensive content than those of smaller newspapers. Larger newspapers' on-line products had news available on the first screen, included national news, provided links to news wires, updated news more frequently, used more non-traditional news writing styles, used multimedia in news stories, provided e-mail addresses, offered on-line discussion forums, allowed searching of classified advertising, and had more comprehensive news archives.

The present study is an exploration of the social context of community editor use of different types of information technologies. Specifically, editor use of information technologies would be expected to be related to the social characteristics of the community, the newspaper, and the editor.

## Information technologies and rural communities

Compared to urban communities, residents of rural communities are disadvantaged in both economic terms, and in terms of access to information[1]. Economic disadvantages include lower income levels, greater economic specialization making the community subject to boom-bust cycles, lower levels of educational attainment, and lower levels of spending on education (Hudson & Parker, 1990; U.S. Congress Office of Technology Assessment, 1991). Rural residents have less access to diverse sources of information relevant to local concerns than urban residents. In a study of community-related differences in exposure to information about cardiovascular disease, it was shown that residents of suburbs had greater exposure to a diversity of sources than residents of regional or small cities (Finnegan, Viswanath, Kahn, & Hannan, 1993). Nationally, metropolitan daily newspapers no longer provide home delivery in most rural communities, further diminishing the availability of locally-relevant information (Donohue, Tichenor, and Olien 1986).

Rural communities are also disadvantaged in terms of development of information technology infrastructure. The lack of communication infrastructure is the result of the greater return on investment associated with placing information technologies in urban areas (Dillman, Beck, & Allen, 1989, pp. 24-25). However, communities that build the necessary infrastructure to make information technologies more widely available in the community often experience mixed results. Widespread development of information technologies in rural communities may also allow metropolitan businesses to gain better access to rural markets.

New technologies do not simply reduce spatial inequalities; they also allow highly centralized, transnational corporations access to the local market (Gillespie & Robins, 1989). Similarly, Camacho, Weinstock, and O'Gorman (1997) argued that simply providing access to under served communities does not necessarily lead to widespread use, particularly when the information available does not appear to be relevant to low income, and minority groups.

Information technologies are similar to a long list of innovations in transportation and communication that both de-centralize and re-centralize communities, but that ultimately result in rural communities being absorbed into metropolitan dominance (Carey, 1989). Ultimately, the community implications of adoption of information technologies are clear only for those communities that don't adopt: those that don't adopt may be left behind (Wolford & Hollifield, 1997).

### Information technologies in the social context

Rural and urban areas are expected to show different patterns of use of information technologies. Other social contexts would also be expected to be relevant. Universally available technologies such as mass media have been shown to contribute to widening gaps in knowledge among citizens with different levels of socioeconomic status (Tichenor, Donohue, and Olien, 1970; McLeod and Perse, 1994; Viswanath and Finnegan, 1996).

Information technologies are also expected to contribute to widening gaps between society's information rich and information poor (Katzman, 1974). Gaps are expected to develop because information technologies are often designed for higher status groups, and because the high cost of early adoption favors groups with more resources (Ettema, 1984;

Abbott, 1989).

As an innovation such as personal computers becomes more widely diffused in the social system, the gap between early and late adopters can be expected to close (Ettema, 1984). Personal computers have declined in cost in recent years. In 1998, personal computers are expected to sell for $600, further deepening the penetration of the innovation among U.S. households. Eventually, 60% of U.S. households are expected to have personal computers. In a December, 1997, survey for *Business Week*, 41% of respondents said they used computers at home (Hammonds, 1998).

Early adopters of all types of innovations are typically younger, wealthier, and more educated than later adopters (Rogers, 1983). The same characteristics are associated with early adoption of information technologies. Reese, Shoemaker, & Danielson (1986) showed that older respondents held more negative and pessimistic views about information technologies. Abbott (1989) showed that the diffusion of teletext/videotext systems followed a typical pattern with early adopters having higher incomes and being younger than nonadopters. Scherer (1989) showed that early adopters of videocassette recorders were younger and more educated. Further, higher status groups tended to use the videocassette recorders to strengthen their control over the information environment. Information poor groups tended to use VCR's as entertainment substitutes for TV news, news magazines, and nonfiction books (Scherer, 1989, p. 101-102). Lin (1996) showed that income was associated with whether an individual was an owner of a personal computer, and non-adopters (non owners) of personal computers had lower incomes than adopters.

A group of studies has questioned the value of social categories such as socioeconomic status in explaining use of information technologies. Ettema (1984) showed that adopters of an agricultural teletext system were younger, more educated and had higher incomes, but the best predictors of use of the technology were innovativeness and the ability to see the importance of the information offered by the system (p. 394).

Similarly, Jeffres and Atkin (1996) expected that demographics would play a less significant role in predicting use of electronic mail and a 500 channel cable system. Instead, the authors argued that attitudes play an important role in determining use of the interactive technologies which characterize the new media environment (Jeffres and Atkin, 1996, p. 328).

Another study showing that social factors did not explain use of information technologies analyzed rural and nonrural respondent use of 18 information technologies including personal computers, telephone credit cards, and toll free 800 numbers. The strongest predictors were number of telecommunications terminals in the home, percent of time spent on information tasks on the job, and attitudes towards computers (LaRose & Mettler, 1989).

One way of addressing the mixed findings regarding the relationships among indicators of social resources and use of information technologies is to observe use of different types of technologies by the respondents. Some technologies are expected to be adopted on the basis of perceived usefulness. Other types of information technologies provide less certain benefits to respondents. Traditional characteristics of early adopters might be more associated with what Rogers (1983) described as incompatible innovations. Findings which show that demographics don't explain adoption and use of information technologies may be based on compatible innovations, defined by Rogers as innovations that are perceived as consistent with the existing values, past experiences and needs of potential adopters (Rogers, 1983, p. 223).

## Research questions

To further understand the relationships among technology type and social categories, each of the research questions will be explored using a wide range of information technologies, including technologies that might be perceived as compatible, and technologies that might be incompatible with the routines of news production.

Previous studies have shown that individuals with higher educations are more likely to be early adopters and heavy users of information technologies (Ettema, 1984; LaRose and Mettler, 1989) and are more likely to have optimistic attitudes toward information technologies (Reese, Shoemaker, & Danielson, 1986). Following Tichenor, Donohue, and Olien (1970) education will be used as an indicator of editor's socioeconomic status.

*RQ1. Will the editors' educational levels will be positively associated with use of both compatible and incompatible information technologies?*

Editors are also constrained by the size and complexity of the newspaper and its parent organization. Editors from smaller, locally-owned newspapers tend to be more concerned with maintaining the economic viability of the organization (Olien, Tichenor, & Donohue, 1988). Similarly, larger, corporate-owned newspapers would be more likely to take the economic risks associated with early adoption of information technologies, particularly if those technologies are required by the parent organization. Smaller organizations would be less likely to risk adopting technologies that are incompatible with the newspaper's need to maintain economic viability. Demers (1996) argues that newspapers with corporate forms of organization are more profitable because of greater economies of scale, but the employees of corporate newspapers are less occupied with concerns about their organization's profits. Editors in newspapers with corporate forms of organization have greater autonomy, greater role specialization, more separation from ownership, and greater commitment to professional values; editors with in-state ownership tend to place greater emphasis on advertising (Demers, 1996; Donohue, Olien, & Tichenor, 1989). The second research question identifies organizational complexity as a factor that would be expected to affect use of information technologies. Organizational complexity is based on what Demers (1996) defined as "corporate forms of organization." A newspaper is more organizationally complex if it is larger and is owned by a large-scale corporation with out of state headquarters.

> *RQ2. Will the newspapers' level of organizational complexity will be positively associated with the editors' use of both compatible and incompatible information technologies?*

This research question suggests that organizational size and complexity continue to provide advantages which are related to the use of information technologies. Larger organizations are in a better position to absorb losses resulting from early adoption of technologies that are not successful, and are in a better position to realize windfall profits from technologies that are successful (Rogers, 1983).

The final constraint confronting editors is the community itself. Social structure constrains or enables individuals and organizations in systematic ways that result in observable patterns of social behavior. Media organizations in one structural environment perform differently than organizations in another structural environment. Community structural pluralism is defined as the "degree of differentiation in the social system along institutional and specialized interest group lines, in a way that determines the potential sources of organized social power" (Tichenor, Donohue, and Olien, 1980, p. 16). This indicator goes beyond population-based definitions of "rural" and "urban" under the assumption that population alone does not fully describe a community. Communities with small populations can be quite diverse, as in the case of small communities that are dominated by a major university. Community structural pluralism is expected to affect editor use of information technologies because of the limitations posed by the lack of telecommunications infrastructure in smaller communities, and because the type of information available through information technologies may not seem to be relevant to community residents (Dillman, Beck, & Allen, 1989).

> *RQ3. Will editors from small, homogenous, rural communities be less likely to use both compatible and incompatible information technologies than editors from more pluralistic communities* ?

If gaps are occurring between groups with different levels of resources, then the differences would be expected to become greater over time. In the original formulation of the knowledge gap hypothesis, Tichenor, Donohue, and Olien (1970) argued that

> "... segments of the population with higher socioeconomic status tend to acquire this information at a faster rate than the lower status segments, so that the gap in knowledge between these segments tends to increase rather than decrease..."

Applying this hypothesis to the current study, the gap between newspapers in more and less pluralistic communities would be expected to widen over time, particularly in regard to incompatible technologies.

> *RQ4. Will newspapers from more pluralistic communities adopt information technologies at a faster rate than newspapers from less pluralistic communities?*

## Methods

Two main data sets were used for this analysis: a statewide data set and a national data set. The statewide data set was used for research questions 1, 2, and 3, and the national data set was used for research question 4.

The statewide data set represents data from a mail survey of a sample of newspaper editors from 74 communities in a Midwestern state. The communities represented a wide range of structural characteristics within a relatively rural, agriculturally oriented, and ethnically homogenous state, and does not constitute a random sample. The survey was conducted between June 4 and August 4, 1997, and the response rate was 89%. The survey was conducted in cooperation with the state newspaper association, and included a number of items related to the editor's adoption and use of information technologies, including: computers used in laying out the pages of the newspaper, use of database software programs, use of electronic news sources, use of on-line services, type of computer connection used, use of e-mail, and whether the newspaper has a presence on the world wide web.

The national data set used for this analysis was newspapers from a sample of 461 U.S. counties. Twenty-four states were chosen first to represent the four main sections of the country. Within each state, a systematic sample of counties was drawn. The home county of the major metropolitan newspaper was added if it had not already been chosen with the above method. A list of all daily and all weekly newspapers in the county was prepared and used for research questions regarding the relationship between community structural pluralism and use of information technology.

**Independent variables: Statewide data set**

The main independent variables used in exploring the research questions involving the statewide data set were editor's education level, the newspaper's organizational complexity, and the community's structural pluralism. Educational level was determined by asking editors "What is your highest level of education" and providing seven categories between "high school graduate" and "doctorate, professional degree, or equivalent". Additional questions about editor's individual characteristics were measured, but were not included in this analysis. The additional items included editor age, gender, years in the newspaper business, and primary duties at the newspaper.

Newspaper organizational complexity was indicated by a summated index comprising standardized measures of the editor's report of the newspaper's circulation, the sum of the number of other media the editor said was held by the owners of the newspaper (including other in-state newspapers, other out-of state newspapers, in-state radio stations, etc.) and a three level measure of ownership type. Ownership type was determined by asking editors: "Which of the below best describes your newspaper's ownership? independently owned, not part of a newspaper group, part of newspaper group with headquarters in state, or part of newspaper group with headquarters out of state (Donohue, Olien & Tichenor, 1989). The reliability of the organizational complexity index was .68.

Community structural pluralism in the statewide data set included standardized measures of city population, county population, percent of the county work force not involved in agricultural, forestry or fisheries occupations, and number of county residents with a bachelor's degree. All data were from the 1990 U.S. Census. Multiple measures are used to indicate the level of community structural pluralism. Community and county population, when combined with average per-capita income, are measures which can indicate the potential of the region to support a greater degree of division of labor and more complex organizations, which can be expected to lead to an increase in formalization of social interaction. The work force measure is an indicator of the degree to which the community has diversified the local economy beyond a basic dependence on agriculture. The education measure, when combined with the other measures, is expected to indicate the potential for development of social power among diverse groups within the community. The reliability of the index was .89.

**Dependent variables: Statewide data set**

The dependent variables for research questions one through three were use of information technologies. Two main types of technology were explored: technologies used in the routine production of the newspaper, and a measure of whether or not the newspaper had a presence on the World Wide Web. In Rogers (1983) terms, production technologies can be conceptualized as being compatible with the values, experiences and needs of editors, and producing an on-line version of the newspaper can be conceptualized as being less compatible with the editor's daily routines. Producing an on-line version of the newspaper requires the editor perform additional tasks beyond the daily routine such as preparing HTML versions of the text and graphics and updating the content more frequently.

Technologies used in the routine production of the newspaper paper were indicated by an index was computed which included the sum of standardized measures of:

number of electronic sources of news received by the newspaper

use of on-line services by the newspaper

type of computer connection used by the newspaper

use of e-mail by individuals within the newspaper

The reliability of the index was: .79. Editor's use of other technologies associated with routine production of the news were measured, but were not included in the index because of the widespread adoption of the technology. These technologies included computers used in putting the newspaper together and word processing software.

An indicator of the editor's use of an incompatible technology was determined by coding the editor's response to the question, "does your newspaper have a home page on the world wide web?" Positive responses were coded as 1, and negative responses coded as zero. Table 1 shows the distribution of the dependent variables within the statewide data set.

Table 1. Use of various information technologies by editors in statewide data set (N:74).

| **Indicators of information technology use** | **percent** |
|---|---|
| percent of newspapers receiving at least one source of electronic news | 71.6% |
| percent of newspapers with a modem or other type of computer connection | 62.2 |
| percent of newspapers using at least one on-line service | 36.5 |
| percent of newspapers with individuals using e-mail | 33.8 |
| percent of newspapers with a presence on the world wide web | 24.3 |

Table 1 shows that all of the technologies that are conceptualized as being compatible with the routine production of the newspaper were more widely used by editors than the indicator of whether or not the newspaper has a presence on the world wide web. Technologies such as electronic sources of news, on-line services, modems and e-mail may provide obvious cost savings for editors looking for ways to more economically acquire information. However, an on-line version of the newspaper may provide less certain benefits, while requiring a new set of skills and routines.

### Independent variables: National data set

The national data set was used in testing the research question about gaps between communities. The independent variables were county structural pluralism and time. County structural pluralism was computed as the sum of standardized values of county population and county seat population. Chronbach's alpha was .76. The index was used to divide the sample into two groups representing counties with lower and higher levels of structural pluralism. In the national data set, the structural pluralism index did not include indicators of county employment or indicators of county educational levels because the measures reduced the index reliability. Because a dichotomous transformation of the index was used, the omission of the two indicators would be expected to have minimal impact on the way communities were grouped.

The other independent variable used in testing research question four was time. Two observations of the dependent variable, described below, were made. The first observation was in March, 1996, and the second was March, 1998. The limitation of this measure it can only show linear relationships, whereas there is some indication that knowledge gaps and diffusion curves are not linear phenomena (Moore, 1987; Rogers, 1986).

**Dependent variables: National data set**

The main dependent variable for the national data set was whether or not the county had at least one daily or weekly newspaper with a presence on the world wide web. A listing of daily and non-daily newspapers with web sites was searched in March of 1996 and again in March of 1998 (American Journalism Review, 1998). Daily and non-daily newspapers listed as providing full service that were within one of the 461 sample counties were included. The obvious limitation of this methodology is that not all on-line publications are listed on American Journalism Review's Newslink web site. However, in order to make the 1986 and 1988 lists comparable, only newspapers appearing on the Newslink site were included in the study.

## Results

This study sought to explore the use of different types of technologies by editors with different social characteristics.

The first three research questions were tested by correlating the independent variables with indicators of both types of information technology. Correlations of technology use with editor education (RQ1); the newspaper's organizational complexity index (RQ2); and the community structural pluralism index (RQ3) are shown in Table 2. Although all of the correlations were in the expected direction, community structural pluralism was the only independent variable that was significantly associated with both measures of use of information technologies.

Table 2. Pearson's correlations of use of two types of information technologies, editor education level, newspaper organizational complexity, and community structural pluralism.

| | compatible technology (information technology index) | incompatible technology (newspaper web presence) |
|---|---|---|
| editor's education level | .16 | .25* |
| organizational complexity | .17 | .56*** |
| structural pluralism | .20* | .53*** |

* p < .05, one tail
*** p < .001

Table 2 shows support for the idea that the structural pluralism of the community is positively associated with use of both types of information technologies, although the correlation coefficient for the structural pluralism-compatible technology index was relatively small (r=.20). Thus, the editors of smaller, rural, less pluralistic communities use fewer information technologies such as electronic sources of news, on-line services, modems or other computer connections, e-mail, and are less likely to have an on-line version of the newspaper. The relatively low correlation coefficients for the information technology index indicates that the traditional correlates of early adoption: educational level of the editor, and the size and complexity of the organization; were not significant predictors of use of the technologies which comprise the index. This is perhaps because the index technologies (electronic sources of news, on-line services, modems, and e-mail) are not innovations, but are rather technologies that have been available for quite some time, and that are compatible with existing routines in the production of the newspaper. Editor decisions about using these technologies may be function of factors not measured in this study, such as perceived usefulness of the technology (Ettema, 1984; Jeffres and Atkin, 1996).

Whether or not the newspaper produces an on-line version, however, more closely fits the expected patterns. Level of education, size and complexity of the organization, and structural pluralism of the community are all positively associated with the newspaper's likelihood of having a home page on the world wide web. It appears, then, that traditional constraints of educational level and organizational size are less likely to affect newspaper's use of technologies that support the normal functioning of the newspaper. However, the production of a home page on the world wide web may require greater change in the way a local newspaper conducts daily business, and thus the traditional constraints come into play more prominently.

The fourth research question was stated as:

> *Will newspapers from more pluralistic communities adopt and use information technologies at a faster rate than newspapers from less pluralistic communities?*

Table 3 shows the gap is growing between less and more pluralistic counties that contain at least one newspaper with a web presence.

Table 3. Counties containing at least one local newspaper with a web presence, by structural pluralism, and by year, in percent.

| | less pluralistic counties | more pluralistic counties | total |
|---|---|---|---|
| 1996 | 1.3% | 12.6% | 6.9% |
| 1998 | 3.5% | 35.7% | 19.5% |
| | N:231 | N:230 | N:461 |

1996 chi-square = 21.1, p < .001
1998 chi-square = 73.9, p < .001

Between 1996 and 1998, an increasing percentage of all counties included newspapers with home pages on the world wide web. The percentage of all counties grew from 6.9 percent in 1996 to 19.5 percent in 1998. Among the less pluralistic counties, the percentage with web newspapers grew from 1.3 percent to 3.5 percent. Among the more pluralistic counties, the percentage grew from 12.6 percent to 35.7 percent. In 1996, the gap between less pluralistic counties and more pluralistic counties was 11.3 percentage points. In 1998, the gap had grown to 32.2 percentage points. Even though nearly all newspapers may eventually adopt the innovation, the early adoption trends seem to follow the classic diffusion patterns, and also seem to indicate the presence of a gap between more and less pluralistic counties.

## Summary and discussion

The community in which the newspaper is located persists as a barrier to the newspaper's ability to adopt and use information technologies. Two main types of information technology were examined: a) technologies compatible with the newspaper routines, and b), a technology that is not compatible with the daily functioning of newspapers -- particularly newspapers that are concerned with profitability and economic survival. Editor use of technologies that were compatible with existing functions of the newspaper, such as pagination and acquisition of information from news wires, were not highly correlated with traditional predictors of early adoption. However, whether or not the newspaper had an on-line version was highly correlated with all the measures of social resources included in this study: editor's education, the newspaper's organizational complexity, and the community's structural pluralism.

Producing an on-line version of the newspaper may provide less obvious benefits to the editor, and may be less compatible with the normal operation of a community newspaper, particularly among smaller newspapers in small, rural, homogenous communities. As a result, the gap between rural and urban communities that contain a newspaper with an on-line version appears to be widening.

In many communities, the local newspaper is as old as the community itself. Local newspapers have survived decades of community change. However, it is increasingly difficult for newspapers to survive in communities with declining populations, increasingly specialized economic bases, and dwindling retail businesses. The adoption and use of information technologies may be another way in which newspapers in rural communities can continue to operate in the face of declining local resources. For example, as residents leave the community, many might like to use an on-line version of the hometown paper to keep in touch with the community. However, if the current trend continues, newspapers in small, rural communities will miss out on what might become a significant source of revenue when, and if, on-line versions of local newspapers become profitable.

The unique aspects of digital forms of communication, while promising to blur the differences among all forms of communication, appear to be less likely to remove the more fundamental constraints facing local mass media in small rural communities.

### Notes

1. Rural is defined here as those counties with fewer than 50,000 people living in towns and cities (Parker, Hudson, Dillman, & Roscoe, 1989).

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# Online Newspapers:
# Living Up to Their Potential?

James W. Tankard, Jr.
Professor
512-471-1997
tankard@mail.utexas.edu

Hyun Ban
Ph.D. student
hyun_ban@mail.utexas.edu

Department of Journalism
University of Texas
Austin, Texas 78712

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## Abstract

# Online Newspapers: Living Up to Their Potential?

McLuhan postulated that new media emulate the forms of old media. This study examined the extent to which online newspapers are taking advantage of the special features offered by the Internet, including hypertext, interactivity and multimedia. While some online newspapers have adopted such innovations as frequent updating, hypertext links embedded in stories, multimedia features other than photographs, and interactivity features other than e-mail addresses and search engines for archives, most have not.

# Online Newspapers: Living Up to Their Potential?

The number of online newspapers in the world nearly doubled in a recent six-month period, bringing the total to 3,622. The number of daily newspapers in the United States with online editions increased from 197 to 492 during the last year (Meyer, 1997).

At this point, online newspapers are a focal point of media convergence, with many ties to traditional print newspapers but with the potential for many new features from the world of mixed-media digital communication, including audio, moving video, animation, and increased user control.

Some critics suggest that online newspapers so far are not living up to their potential (Harper, 1996; Shaw, 1997a). The critics claim that many online newspapers are following the old newspaper guidelines of presenting news every 24 hours instead of updating continuously, that they are merely placing the content of their print newspapers ("shovelware") online, and that they are not taking advantage of such special features of the World Wide Web as interactivity, hypertext, and multimedia.

McLuhan noted that the content of a new medium is always another medium (McLuhan, 1964). He pointed out that radio was initially know as "wireless," indicating it was thought of as a new form of telegraph. The term "online newspaper" may show the same kind of thinking. If, as McLuhan suggests, online newspapers are being thought of in terms of print newspapers, they might not be taking advantage of particular features of the web such as interactivity, the possibility for frequent updating (immediacy), and the potential for hypertext links and other kinds of original material (originality of content).

*Los Angeles Times* media critic David Shaw observes that "With some notable exceptions, online newspapers tend to use 'shovelware': they essentially shovel the content of their printed papers onto the Internet, without either providing much new or original material, making it truly interactive, displaying it in a significantly more compelling fashion or doing anything else that sites created specifically for the Net routinely do (Shaw, 1997a)."

### *Potential for Immediacy*

Online newspapers offer the potential for much greater immediacy in news coverage. One writer has suggested that "online newspaper editions and 24-hour cable news channels have obliterated the news cycle, increasingly exponentially the opportunities to get the story out" ( Moore, 1998). Scott Woelfel, editor in chief of CNN, notes that the 24-hour deadline is an artificial one based on distribution needs (Lasica, 1997).

But other authors suggest that the online newspapers of today may be following the deadline every 24 hours that is characteristic of daily print newspapers. A content analysis of online newspapers by Gubman and Greer (1997) found that 71.1 percent updated no more often than daily. One problem may be that many newspapers do not allow their online version to scoop their print versions (Ross, 1998).

### *Potential for Hypertext*

One of the strong features at the core of the World Wide Web is hypertext links, or hot links. Using Hypertext Markup Language (HTML), web page creators are able to place within their documents links that, when clicked on, take the reader to another page or another web site entirely. Hypertext links of this type have the potential to change the very nature of written text from something linear and with discrete boundaries to something with multiple entry points, multiple paths determined by the user, and no boundaries (Bolter, 1991). Negroponte notes that hypertext removes the limitations of the printed page. With hypertext, he suggests, "an expression of an idea or train of thought can include a multidimensional network of pointers to further elaborations or arguments, which can be evoked or ignored" (p. 70). Hypertext links could be particularly useful for bringing context and background into news stories. They could also be used to structure news very differently. News stories could be created in small modules, with the reader being allowed to define the story structure by choosing the links he or she wishes. But online newspapers may not be taking advantage of this feature.

### *Potential for Multimedia*

Another strength of the web is the opportunity for offering not just text but photographs, animated graphics, audio clips and video clips. As Sheizaf Rafaeli noted, "The Net's capacity for addressing senses far surpasses that of any other medium. In a sense, this indicates that the medium serves less than ever before in a constraining, guiding role" (Newhagen & Rafaeli, 1996, p. 5). In the future, these varieties of media will probably be integrated seamlessly so that a user hardly notices shifting from one to another (Negroponte, 1995). But even now, it is possible for an online newspaper to offer audio clips of sound bites or video sequences of news events.

### *Potential for Interactivity*

The web also offers the potential of much greater interactivity between the user and the medium than print newspapers. Negroponte (1995) visualizes the newspaper of the future as being highly personalized, with the computer learning what kind of content a particular user wants and producing a customized online edition.

But it is not clear that online newspapers will take this path. Howard Rheingold (1993) has expressed concern that the new media may be seen as "ever-more-effective conduits for broadcasting more of the same old stuff to more people, with most interactivity limited to channel selection" (p. 274).

In one examination of online newspaper interactivity, Gubman and Greer (1997) found that only 55.4 percent of the online newspapers they looked at provided either a reporter's or editor's e-mail address or gave addresses for specific departments, while only 40 percent provided forums for users to discuss news and issues.

Tremayne (1997) studied 15 online sites (newspaper, television and other) and found they scored an average of 3.0 on an interactivity scale ranging from 0 to 6. His results showed that the newspapers showed more interactivity than the television sites, but his sample of five online newspapers was made up almost exclusively of sites associated with large circulation newspapers. He also found that newer sites tended to offer more interactivity than older sites.

### *Potential for Expanded News Coverage*

The availability of space on the World Wide Web means that online newspapers also have the potential for increased coverage of local news. Newspaper critic Shaw says, "The Internet, with its infinite 'news hole,' can — at least in theory — provide more detailed local news and information than even the best local newspapers" (Shaw, 1997b). James H. Denley, editor and president of the *Birmingham Post Herald*, has said one of the reasons his publication created an online newspaper was to serve the community with local information (Harper, 1996, p. 10).

A previous study provides support for the notion that online newspapers might not be taking full advantage of the features of the web. Gubman and Greer (1997) examined to what extent online newspapers were accurately described by their critics. They found that few online newspapers updated their content more than once a day, few used multimedia elements, few attempted to put a local spin on national news, and few offered online discussion forums. But they did find that online newspapers were doing better than critics contend in putting news on the first screen available and in providing for interaction with readers via e-mail.

### *Predictors of Use of Web Innovations*

Gubman and Greer (1997) found that sites associated with larger newspapers were more likely than sites associated with smaller newspapers to put news on the first screen, carry national news, provide links to news wires, update frequently, deviate from traditional newswriting style, use multimedia, provide e-mail addresses, offer online discussion forums, and have comprehensive archives. They found that the age or start-up date of a site was related to whether advertising is present, but not to the other characteristics of online newspapers.

Tremayne (1997) found that newer sites offered more user interactivity features than older sites, but he only looked at 15 sites.

In a study of print newspapers, Lacy and Bernstein (1988) found that large circulation dailies gave a greater percentage of news space to staff coverage, foreign news, and in-depth coverage than small or medium circulation dailies. They attribute the differences to the greater financial resources and larger staffs of large newspapers.

In summary, size of the news organization and age of the online newspaper site are among the most promising predictors of use of web innovations.

### *Research Questions*

This study attempted to assess to what extent online newspapers are taking advantage of the opportunities for new forms of digital communication offered by the World Wide Web. The study attempted to answer the following questions:

1. How frequently do online newspapers update their sites?
2. To what extent are online newspapers providing hyperlinks associated with specific news stories?
3. To what extent do online newspapers offer multimedia features?
4. To what extent do online newspapers offer interactivity features to users?
5. To what extent do online newspapers include material not contained in the print newspapers associated with their sites?
6. Are there relationships between selected predictor variables (age of online site, size of online staff, size of audience, and circulation of the associated print newspaper) and the tendency of the online newspapers to adopt special features of the World Wide Web?

*Method*

The research questions were answered by means of an e-mail survey of online newspapers and a content analysis of the web sites of responding online newspapers.

The e-mail questionnaire was sent to the census of 424 full-service, general circulation U.S. daily online newspapers listed by *American Journalism Review*'s NewsLink. This number is lower than the figure of 492 reported in an *American Journalism Review* article (Meyer, 1997) because some newspapers are sharing web sites, some of the 492 were not dailies, and some of them were other types of sites such as business publications. Four follow-up mailings of the questionnaires were sent to online newspapers that had not responded. The original mailing and follow-ups took place in October and November, 1997.

The survey was designed to include questions measuring variables dealing with basic characteristics of the online newspapers and variables measuring the tendency of an online newspaper to take advantage of computer-mediated communication and special features of the World Wide Web. A pretest of the e-mail questionnaire was carried out with 20 online newspapers randomly selected from the list. On the basis of the pretest, some questions were rewritten for greater clarity.

The content analysis was conducted with the online newspaper sites for the 135 online newspapers that responded to the e-mail questionnaire. A coding form was developed and tested for coder reliability. After revision and retesting, Holsti coefficients for all variables kept on the coding form ranged from 70% to 100%. The content analysis of web sites took place in February, 1998.

Circulations of newspapers associated with online newspapers were obtained from the *1997 Editor & Publisher International Yearbook*.

*Variables from the survey*

Variables dealing with basic characteristics of the online newspaper included age of the site in months, number of employees in the online operation, and number of site visitors per day. The question measuring number of site visitors per day asked "how many users visit your site per day?" But questionnaire responses made it apparent that many answers were being given in terms of average number of hits or impressions per day, which could be much higher than the number of unique visitors, so this variable needs to be interpreted with caution.

Variables from the survey related to the tendency of an online newspaper to take advantage of computer-mediated communication and special features of the World Wide Web included amount of web-only content in the online newspaper, immediacy (how frequently they updated their sites), and interactivity (are e-mail addresses provided for individual staff members, to what extent is e-mail answered).

*Variables from the content analysis*

The content analysis was designed to measure variables related to use of hypertext links, various aspects of multimedia, and several kinds of features providing opportunities for user interactivity.

The first three news stories on each site were coded according to the following categories of use of hyperlinks:

1. There are no hot links associated with the story.
2. There are hot links associated with the story but they are grouped at the begining or the end or the side of the main text.
3. There are hot links within the main text of the story.

An index of hypertext use was created by assigning a 1 if a story had either kind of link and a 0 if it did not and then summing the scores for the three stories.

The sites were examined for the presence or absence of the following multimedia features: video clips, audio clips, animated (moving) graphics, tables or graphs, and photographs. In addition, an index of multimedia use was constructed by assigning one point for the presence of each feature and adding the number of points.

The sites were examined for the presence or absence of the following features offering some kind of interactivity to the user: search engines for news archives, chat rooms, discussion forums or bulletin boards, e-mail addresses for the editor or webmaster, customized news services, surveys or polls (excluding rating of the web site), and interactive games. In addition, an index of interactivity was created by assigning one point for the presence of each feature and adding the number of points.

## *Results*

Responses were received from 135 of the 424 online newspaper sites, for a response rate of 32 percent.

The sites ranged in age from three months old to 40 months old, with the average being 18.3 months.

The size of the online staffs ranged from 0 to 55 fulltime workers, with the average being 4.8 (Table 1).

The number of site visitors per day ranged from 20 to 235,000. The mean was 8,926, the median was 1,600, and there were two modes at 1,000 and 3,000. These numbers may be high. As noted before, respondents may have been reporting number of page hits or impressions rather than number of site visitors.

## Immediacy

Most (56 percent) said they updated their site every 24 hours, indicating a rather close adherence to print newspaper deadlines. Another 41 percent said they updated more frequently than every 24 hours, and 3 percent said they updated less frequently than every 24 hours (Table 2).

## Hypertext

The content analysis examined 396 online newspaper stories to determine whether they contained hot links. It found that 94 percent of the stories contained no links, 5 percent contained links at the top, bottom or side, and 2 percent contained links embedded within the text. By and large, online newpapers were taking stories from the print newspaper and putting them on the web site without adding links.

## Multimedia

The content analysis found that 77 percent of the online newspapers used photographs on their site, but fewer than 10 percent of the sites offered animated graphics, audio clips, video clips or tables or graphs (Table 3).

## Interactivity

Two measures of interactivity came from the e-mail questionnaire. THese variables were whether the site offered users the possibility of interacting via e-mail and to what extent they made individual replies to those e-mail messages. A large majority (74 percent) of the sites indicated they provided e-mail addresses for at least some individual staff members (Table 4). This may not amount to much in the way of interactivity unless the user's messages receive replies, however. Nearly half (49 percent) of the sites said they answered 100 percent of the non-spam messages they received and most of the sites answered at least 50 percent (Table 5).

Interactivity was also measured through the content analysis (Table 6). A majority of web sites offered e-mail addresses for the editor or webmaster (96 percent) and search engines for archives (64 percent), but fewer than half of the online newspapers provided the other interactivity features.

### Original Content

Most online newspapers (73%) reported in the e-mail survey that they contained material not included in the print newspapers associated with their sites (Table 7), but this extra material often consisted of dining guides, tourism information, information about the region, and special project stories. A majority of the sites (51%) reported that none of the material in their online news site was written by online news staff members (Table 8). The average percentage of material written by online staff members was 13 percent, suggesting a rather heavy recycling of material from the print newspaper.

### Predictors of Use of Special Features of the Web

Analyses were conducted to find the best predictors of the tendency of online newspapers to adopt the special features of the World Wide Web (Table 9). The two predictor variables that correlated significantly with dependent variables were size of the online staff and circulation of the associated newspaper.

Size of the online staff correlated (.43) with frequency of updating the site, indicating that sites with large staffs updated more frequently. Size of the online staff also correlated posivitely with the hyperlinks index, indicating that sites with larger staffs were more likely to insert hyperlinks in specific news stories.

Circulation of the associated newspaper correlated (.36) with frequency of updating the site, indicating that sites associated with larger organizations updated more frequently. Circulation correlated positively with the interactivity, hyperlinks, and multimedia indexes, indicating that larger organizations were more likely to offer features for user interactivity, were more likely to insert hyperlinks in specific stories, and were more likely to use multimedia features on their web sites.

### *Discussion*

In line with McLuhan's notion that the content of a new medium is an older medium, most online newspapers seem to be relying heavily on content from their associated print newspapers. More than half the online newspapers said none of the material on their sites was written by online news staff members. The average percentage of material written by online staff members was 13 percent.

In another similarity to the previous technology of print newspapers, most online newspapers seem to be updating their pages no more frequently than every 24 hours. Some newspapers, including the *Dallas Morning News* (Weise, 1998) and the *San Jose Mercury News*, (Ross, 1998) have begun breaking stories on the web that have not appeared in the print newspaper first. But it appears that most online newspapers have not adopted that policy.

The two measures of interactivity from the e-mail indicate some adoption of interactivity by online newspapers but perhaps not at a breakneck speed. A large majority of the sites in the study provide e-mail addresses for individual reporters or departments. But interactivity probably means that messages should receive replies, and only about half the online newspapers report answering all e-mail messages from users.

The content analysis showed most online newspapers were providing e-mail addresses for the editor or webmaster and search engines for archives, but that few providing such other means of user interactivity as discussion forums, chat rooms, surveys or polls, customized news services, and interactive games.

Putting these findings together, it appears that many online newspapers are simply using the online site to mirror or reproduce the content of the print newspaper associated with the site. While some online newspapers appear to be taking advantage of such features of the World Wide Web as frequent updating, hypertext links embedded in stories, multimedia features other than photographs, and interactivity features other than e-mail addresses and search engines for archives, most online newspapers are not.

One reason that many online newspapers do not create more original content may be the cost. Placing hypertext links in text in a meaningful way is a time-consuming endeavor. Many of the online newspaper sites reported having only one or two staff members. With a staff that small, it would be difficult to do more than just take the stories from the print newspaper and place them on the web page. Even maintaining a minimal web site is expensive. In the last year, many newspapers have abandoned their online sites because of the cost (Stone, 1997).

Online newspapers may be slow to start utilizing hypertext links and other web features for a number of reasons. It is very labor-intensive to add hypertext links or multimedia features to individual stories. In the case of hypertext links that might go outside of the site, online site workers may not want to promote commercial enterprises by linking to them and they may not want to have visitors leave their own site. And, as McLuhan noted, journalists may be thinking of the new medium in terms of the old medium — print newspapers with discrete stories and no audio or video. In addition, some online newspaper sites seemed to be designed primarily as a means of promoting the associated print newspapers.

The examination of predictor variables indicates that innnovativeness in using World Wide Web features in online newspaper sites is most strongly associated with the size of the online newspaper staff and the circulation of the associated print newspaper, which is probably a measure of the size of the organization. The importance of circulation of the associated print newspaper as a predictor was also indicated in the Gubman and Greer (1997) study.

There may be two major types of online newspapers — large ones supported by large staffs and small ones where one or two staff members have to do all the work. It is easy to see how one or two people trying to put out an online newspaper every day might resort to taking content from the print newspaper and putting it on the web page unaltered, might have trouble updating more than every 24 hours, and might not want to take on additional duties.

Online newspapers appear to be taking advantage of some of the special features of the web, although slowly. Most are providing e-mail addresses, at least for the editor or webmaster. Most are at least including photographs. A few are writing at least some of their own content and updating more than every 24 hours. Most are not taking full advantage of the opportunities for hypertext links in news stories — a feature that is developed much more strongly in many other areas of the World Wide Web. Most are not providing the most meaningful forms of user interactivity such as discussion forums and chat rooms that might facilitate the discussion of public issues. And most have not ventured very far into multimedia, with very little offering of audio clips or video clips.

Online newspapers are in a state of rapid evolution. In the near future, we will undoubtedly see some features expand and become common as others drop by the wayside. As Negroponte (1995) has suggested, the online newspaper of the future won't be much like the ones in existence today.

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### Table 1

### Size of online news staff

| Number of staffers | |
|---|---|
| 0 | 10% |
| 1-1.5 | 25 |
| 2-2.5 | 19 |
| 3-3.5 | 13 |
| 4-7 | 17 |
| 9-55 | 16 |
| | 100% |
| mean | 4.8 |
| mode | 1 |
| median | 2 |
| range | 0-55 |

### Table 2

### Frequency with which the online news operation places new material on its web site

| | |
|---|---|
| As soon as possible — we are constantly updating | 12% |
| More frequently than every 24 hours | 29 |
| Every 24 hours | 56 |
| Less often than every 24 hours | 3 |
| | 100% |

Table 3

Percentage of online newspapers having various multimedia features

| | Percent |
|---|---|
| Photographs | 77 |
| Animated (moving) graphics | 9 |
| Audio clips | 4 |
| Video clips | 2 |
| Tables or graphs | 2 |

Table 4

Whether the site provides e-mail addresses for individual staff members or departments

| | |
|---|---|
| Yes | 74% |
| No | 25 |
| No response | 1 |
| | 100% |

Table 5

Percentage of e-mail messages to the site receiving individual replies

| | |
|---|---|
| 0-50 percent | 15% |
| 51-99 percent | 31 |
| 100 percent | 47 |
| No response | 7 |
| | 100% |
| mean | 82.7 |

Table 6

Percentage of online newspapers having various interactivity features

| | Percent |
|---|---|
| E-mail address for editor or webmaster | 96 |
| Search engine for news archives | 64 |
| Discussion forum/Bulletin board | 26 |
| Chat | 12 |
| Survey or poll (not just for rating site) | 10 |
| Customized news | 4 |
| Interactive games | 3 |

## Table 7

## Whether the site provides content not provided by the newspaper associated with the site

| | |
|---|---|
| Yes | 73% |
| No | 27 |
| No response | 1 |
| | 100% |

## Table 8

## Percentage of material on the online site written by online staff members

| | |
|---|---|
| None | 51% |
| 1-10 percent | 30 |
| 11-100 percent | 26 |
| No response | 3 |
| | 100% |
| Mean | 13.3% |

Table 9

Correlations between predictor variables and the tendency of the online newspaper to adopt special features of the World Wide Web

| | **Predictor variables** | | | |
|---|---|---|---|---|
| | Age of online site | Size of online staff | Size of audience | Circulation of print newspaper |
| **Variables measuring tendency to use Web features** | | | | |
| Frequency of updating the site | .06 | .43** | .09 | .36** |
| Hyperlinks index | .00 | .34* | .00 | .36** |
| Multimedia index | -.12 | .21* | -.10 | .25** |
| E-mail addresses for staff | -.10 | -.11 | .17 | -.07 |
| Extent of answering e-mail | .21 | .18 | -.01 | -.01 |
| Interactivity index | -.09 | .19 | -.15 | .32** |
| Amount of web-only content | -.10 | -.05 | .18 | -.06 |

* $p < .05$

** $p < .005$

# "Digital Imaging and the Photojournalist: Work and Workload Issues"

**By John Russial**

School of Journalism and Communication
1275 University of Oregon
Eugene, OR 97403

Phone: 541-346-3750

e-mail:
jrussial@oregon.uoregon.edu

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ABSTRACT

## "Digital Imaging and the Photojournalist: Work and Workload Issues"

This paper examines the impact of digital imaging on the nature of newspaper photojournalism work. The shift from chemical to digital processing has brought an increase in workload to photo departments, in most cases without a concomitant increase in staffing. The study, which is based on a national sample of photo editors, offers some support for the view that news production technologies are greeted with some ambivalence in newsrooms because they both enrich the job and enlarge it at the same time. Photo editors are largely positive about digital imaging, saying that it increases photographers' flexibility in working with images and autonomy but that it also makes photo work more routine and leads to a greater priority on production.

# "Digital Imaging and the Photojournalist: Work and Workload Issues"

Has digital imaging changed the job of photojournalist? On a superficial level, the answer is "Of course it has." Photographers and photo editors now work with their images on a computer screen instead of in a chemical darkroom. On a more fundamental level, does the shift in the technology of photojournalism also change the nature of what photojournalists do, in particular, the type of tasks they spend a great deal of time performing? If so, what are the implications?

The change from chemical to digital processes has also been a shift of responsibilities for photo reproduction within the newspaper. It means that photographers and photo editors can exercise greater control of their work – from image capture throughout most of the prepress process. It also means that to do their jobs, photographers and photo editors now rely increasingly on computers and that digital imaging experience has become an important hiring criterion.[1] Photo departments now do the bulk of digital image processing,[2] reflecting a movement of some work from production departments (process camera and imaging). One potential effect of an increase in workload is a reduction in quality, especially if there is no concurrent increase in staffing. How great an increase in workload and whether such as increase has been addressed by additional staff resources are important questions for newspapers to consider. Another important question, or set of questions, has to do with whether the introduction of digital imaging has changed the nature of news photography work and thus the job of the photojournalist.

There is evidence that a similar shift to a computerized news production process, from composing room paste-up to newsroom pagination, has had both positive and negative impacts on another group of newsroom workers – editors. It has increased their control but has limited the time they have for traditional journalistic tasks – and has, in effect, changed the nature of editing work.[3] This study, based on a national sample of daily newspaper photo editors, explores whether digital imaging is perceived to have similar effects.

## Background

Digital imaging in newspapers primarily refers to image processing, through the use of negative scanners, computers and software such as Adobe Photoshop. Increasingly, the term also refers to image capture, as some newspapers are phasing digital cameras into daily use. Wire services and a handful of papers digitally processed images in the late '80s, primarily through expensive proprietary systems such as Scitex. But digital photo handling exploded at newspapers in the early '90s through the rapid adoption of the Associated Press Leaf Desk and the use of Photoshop, the off-the-shelf image-handling software, as well as Macintosh computers to run it.[4]

Most research on digital imaging has focused on the ethics of digital manipulation.[5] Research also has been done on digital imaging as a criterion in hiring and training,[6] and one case study detailed a newspaper's decision to place responsibility for digital imaging and pagination in production departments, primarily to give editors and photographers more time to spend on traditional journalistic tasks.[7] Otherwise, analysis of the impact of digital imaging on photojournalism has been limited to an occasional trade journal account.[8]

The most closely related research has dealt with pagination, a similar news production technology, that was introduced into many newsrooms before digital imaging – in some cases as early as 1980.[9] Several studies of pagination's impact have identified two dimensions of changes in the job – those that relate to journalistic tasks and those that relate to production tasks. Stamm, Underwood and Giffard factor-analyzed a list of questionnaire items about changes in priorities editors assigned to a list of editing tasks. Two factors – a journalistic task factor and a production task factor – emerged.[10]

Other researchers have found that copyeditors and page designers appreciate the flexibility and control of the work that pagination affords them. At the same time, editors worry about the increasing production demands and consequently about the quality of the work they are able to do on more traditional tasks, such as copyediting and headline-writing.[11]

Is a similar effect at work in digital imaging? Might increased responsibility for production-oriented tasks limit the time photojournalists have to spend on journalistic tasks and perhaps adversely affect quality?

The practice of newspaper journalism historically has entailed some level of production responsibilities for news workers. Since the mid-'70s, when the use of computers became widespread in newsrooms, those production burdens have increased. Some current job categories, such as copyeditor, page designer, graphic artist and photographer, have a greater production role than others in the newsroom, in part because of their closer tie to the actual manufacture of the newspaper as a product, in part because of the relative importance of computer systems to the work done by journalists who fill those jobs.

Technology has been an integral part of news photography from the beginning. News photographers have had to understand cameras, lenses, lighting, and the chemistry and equipment used in film processing and printing. Zelizer points out that photographers struggled as far back as the 1930s for recognition as professionals rather than as mere technicians,[12] and some say that struggle continues today.[13] In news photography, tasks analogous to some digital image adjustments were traditionally done by photographers in chemical darkrooms. Examples are dodging, burning and adjusting contrast. Other tasks now primarily done by photographers are more analogous to work traditionally done in production departments. Examples are scanning, color correction and color separation.

Some have raised concerns that the emphasis on technology might adversely affect quality. Jim McNay, a photojournalism teacher at San Jose State University, said, "Every time I meet with professional photographers, I notice how much the discussion is about software and technology and how little is about content."[14] In 1993, Gary Haynes, Philadelphia Inquirer assistant managing editor for photography and graphics, said: "By default we have become production departments."[15] Ken Irby, a photography associate at the Poynter Institute, worries about workload and quality. He said, "Here's the scary part: [Many] news departments have eliminated their back shops, so photographers are assuming much more of the responsibility" for color correction and output.[16] Others see no cause for concern. George Frajkor of the Carleton University School of Journalism, said, "Digital photography is easier, faster, and in the long run better than chemical."[17]

Digital imaging may lead to other types of changes in the work life of news photographers, such as increased interaction with reporters and editors. Photo editors and educators say that computers let photographers come out of the darkroom and join the rest of the staff.[18] Others express concern that because photo processing no longer must be done in a darkroom, news editors might assume responsibilities for image handling and in the process photographers may lose some autonomy and control of their images.[19]

## Computers and work

Russial has argued that computerization has had different impacts on different categories of newsroom workers and that a key distinction can be drawn between computer systems used for news gathering and those used for news production or processing. Examples of news-gathering systems are front-end systems used for reporting, database systems used for Computer Assisted Reporting, news library systems, photo archiving systems and digital cameras. Examples of news production technologies are pagination systems, digital darkrooms and front-end systems used for production (primarily by copyeditors).[20]

Following this logic, journalists should report positive impacts in news-gathering systems, because after an initial training period, they can use these tools to do what they have long considered professional work in more efficient and effective ways. Systems for news production will be viewed with greater ambivalence. They too require an initial training period, but afterward, these tools enable journalists to perform some journalistic tasks more effectively and typically offer them greater control of content, but they also tend to increase their workload. Russial refers to the process as a "technological job enlargement," in that new production tasks are added to the existing set of journalistic tasks through the introduction of news-production systems. He says one of the key effects is a limitation in the discretion journalists have in deciding how much time to spend on traditional journalistic tasks. Brill reported a paradox of pagination – that creativity was a benefit but that copyeditors were spending less time on word-related tasks.[21] Underwood, Giffard and Stamm refer to this process of workload shift in the case of pagination as a "displacement effect,"[22] and in another study, they point out that the effects of pagination's implementation are mixed – contributing to both satisfaction and dissatisfaction.[23]

In broader studies of computers and work, the impact of information technology is typically construed in either/or terms. Information technology, for example, has been characterized as "professionalizing" or "deprofessionalizing.[24] It has been hailed for enriching jobs by increasing workers' skills through flexibility and cross-training.[25] It has been criticized for degrading jobs by "deskilling" workers through the separation of the conception of work from its execution.[26]

One of the best articulated arguments is made by Zuboff, a management scholar who argues that technology can be "automating" or "informating." Automating refers to the replacement of skills by machinery; "informating" refers to a shift from action-centered skills to "intellective" skills such as understanding and judging information. The computer is the key, and it can be used either to automate or informate.[27] Zuboff says the informating capability of what she calls "the smart machine" tends to eliminate the distinction between white and blue collar work, and she suggests that the integration of mental and manual dimensions of work is a positive outcome of technological change.[28]

Russial has suggested that either/or perspectives fail to explain the impact of news production technologies on the white-collar work of journalism. In general, computerized news production technologies are neither primarily degrading nor enriching (neither informating nor automating, to use Zuboff's terms) but in effect can be both at the same time. This duality should help explain the ambivalence journalists feel in the face of those technologies. Moreover, it should offer a better basis for understanding the implications of computerization on such important issues as quality of work, quality of work life and job satisfaction.

In the case of digital imaging, does newspaper photography now include a substantially greater amount of production work, and if so, has this change in the job been met with ambivalence, as it has with pagination? Further, what are the implications for quality of photo work in daily newspapers?

## Method

Photo editors at daily newspapers in the United States were surveyed in February and March 1997. Newspapers and addresses were selected from the 1996 Editor and Publisher International Yearbook through a systematic random sample. Only newspapers with circulation of more than 7,500 were surveyed, even though most smaller newspapers also process images digitally. Those papers were not included because the purpose of this study was to examine the impact of digital imaging on journalists whose primary responsibility is photography. At very small papers, reporters and editors often also work as photographers, and some of these papers do not have a photo department as such.

One mailing took place in February 1997. In early March, a second mailing included a follow-up letter and another copy of the survey. Both mailings were addressed to the photo editor, chief photographer or photo department director as listed in the Yearbook. If a newspaper's listing in the E&P Yearbook did not list a supervisory position for photo, the mailing was addressed to "Photo editor." The response rate was 62.2 percent, representing 225 newspapers out of 362 surveyed.[29]

Research questions

I. What does a photographer's average workday entail? Photo editors were asked to estimate how much time photographers spend, on average, on a variety of tasks. Examples are traditional photo tasks, such as shooting, editing, developing film and planning assignments, and on computer tasks, such as scanning, using Photoshop and using the Leaf Desk.

II. Did digital imaging lead to changes in workload and staffing?

Photo editors were asked how workload changed as a result of digital imaging. They also were asked to estimate the percentage of work that shifted:

a) From production departments to the photo department
b) From the photo department to production departments
c) From the photo department to the newsroom.

The most likely shift is the first, because digital imaging, like VDTs and pagination, enables newspapers to save back-shop costs by moving image processing into editorial departments. It is possible, however, that work could have been moved from photo to other departments. One medium-size newspaper, for example, created a back-shop imaging department to do the bulk of its image processing work, and other papers have retrained production personnel to do some image-processing tasks.[30] The third scenario – work shifting from photo to the newsroom – also is possible, particularly at small papers, where staff members have to wear many hats. A Mac loaded with Photoshop can be placed as easily on a news desk as it can on a table in a photo department, and Leaf Desks often are placed in the newsroom, where they can be used by news as well as photo editors.

Photo editors also were asked how long the paper had used digital imaging, making it possible to examine whether perceived workload decreases with experience. It is a common belief in newspapers that workload will jump sharply when a complex new technology is introduced because it takes time for workers to learn to use it efficiently but that it will drop back once the workers become familiar with it. Size of newspaper also might relate to workload and staffing increases, because smaller papers often have disproportionately fewer staff resources.

By many accounts, newspapers did not hire enough staff (at least initially) to address the workload increase that resulted from the introduction of earlier news production systems, and concerns often were raised in trade journals and at professional meetings about overwork, burnout and quality. In the case of digital imaging, the economic climate of the early to mid-'90s might have played a role in hiring. Digital imaging was introduced at many papers during a period of general belt-tightening and downsizing, making it less likely that photo staffs were increased to make up for any workload increase.

III. What is the impact of digital imaging on quality of work and quality of work life? The photo editors were asked whether they agreed or disagreed with 14 statements about the impact of digital imaging on their departments. The statements were based on variables identified as important in studies of pagination.

The following are the statements; responses were registered on a 5-point scale with the midpoint as neutral:

Photo deadlines have improved
Photographers have more autonomy
Photo content has improved
Photo work is more routine
Photographers have less control of their images
Photographers interact more with reporters, editors and designers
Photographers have new opportunities
Photographers have greater flexibility in working with images
Photographers face more limits on their work
Desk editors now have greater control of photos
Photographers have more time to spend on content
Quality of photo reproduction is worse
Photographers have more time to spend on journalistic tasks
Production has become a higher priority for the photo department

In their study of pagination and job satisfaction, Stamm, Underwood and Giffard used factor analysis to identify dimensions of priority for journalistic vs. production tasks and to identify dimensions of change in the job of editor. They found increased priority on production, which contributed negatively to job satisfaction.[31]

In this study, factor analysis of impact statements is used to test the hypothesis that because digital imaging is a news production technology, photo editors will be somewhat ambivalent toward it – that they will feel it has positive as well as negative impacts on quality and on work life. The analysis should produce a key factor that loads highly on positive impacts, such as flexibility, autonomy and control of images, as well as negative impacts, such as increased production responsibility, routinization of work and reduced quality.

## Results

I. A photographer's workday (Table 1)

Shooting photos – a traditional task – takes up the greatest part of a photographer's day, but computer work is not far behind. The highest-ranking task after shooting was "working on a computer," a general category of activity that overlaps a variety of tasks, such as image processing in Photoshop, scanning negatives, using the Leaf desk for picture editing[32] and using a photo archive. Editing, planning photo shoots, developing film and attending meetings also take up some time. Printing photos is almost negligible, reflecting the almost complete shift to digital processing.[33]

II. Workload, staffing

In general, photo editors report that digital imaging has increased the workload of the photo department. A total of 65.7 percent of photo editors said workload was "much" or "somewhat heavier"; 28 percent said the workload was "much heavier." About 26 percent said workload had stayed the same, and about 8 percent said workload was "somewhat" or "much lighter."

In general, photo editors report that workload has shifted primarily from production departments as a result of digital imaging, though some indicate that workload has shifted from photo departments to either production units or to the newsroom. Table 2 reports the percentages of photo editors who estimated the various possible shifts.

There appears to be no relationship between length of time using digital imaging and perceived workload (Table 3). This lack of relationship may challenge the perception that workload increases sharply for a time after a new technology is introduced but then drops back to a "normal" level. This finding is more suggestive than definitive because digital imaging might have a relatively short learning curve, and the question was not sensitive enough to address an impact based on a learning curve of, say, several months. Anecdotal reports do suggest that Photoshop takes quite a while to master, and the results here, combined with the reports that workload is greater after digital imaging, suggest that the increase in workload has more to do with a permanent shift in production responsibilities rather than a one-time learning-curve penalty.

Larger papers disproportionately report increased workload (Table 4). It is unclear why that might be the case. Smaller papers tend to have disproportionately fewer staff resources, suggesting that a shift in workload might be a greater burden on a relatively small photo staff. Perhaps larger papers feel a larger burden of increased workload because they use (and must therefore digitally process) more photos.

### Staff resources

Despite workload increases, most papers did not increase staffing as a result of digital imaging. About 29 percent said their papers added staff, 5 percent said staffing was cut, and about 66 percent said staffing remained the same. Smaller papers were less likely to have added staff (Table 5), though, as noted in Table 3, they also were more likely to say workload stayed the same or decreased.

## III. Changes in work and work life

A factor analysis of the 14 impact statements using principal components analysis and Varimax rotation yielded three interpretable factors (Table 6). The first factor had high loadings on statements that reflect improved quality of work (improved content and greater flexibility) and quality of work life (greater interaction with others, more autonomy and more opportunities). Other high loadings were statements that reflect increased production demands and greater routinization of work, which suggests an erosion in quality of work life. The two highest-loading statements reflect that duality – greater flexibility in working with images as well as greater emphasis on production, which have been negatively associated with job satisfaction in a pagination study.[34] This factor, though primarily positive, suggests some ambivalence toward digital imaging.

A second factor can be interpreted as highly positive. Two very high-loading statements reflect an increase in the time photographers can spend on content and on journalistic tasks.

The third factor is strongly negative, with the two highest-loading statements indicating a loss of control of their images by photographers and a gain in control by desk editors. Taken together, the three factors suggest that photo editors view have a generally positive view about the impacts of digital imaging but that they also have some ambivalence.

Factor scores were computed and correlated with the workload variables. The ambivalence factor correlated with the workload shift from production to photo – the amount of time photo departments spend doing work that had been done in production (r= .36, p =.000). The positive-impact factor did not correlate significantly with any of the workload shift variables, but it did correlate with perceived workload. (r=-.33, p= .000). In other words, photo editors who felt workload stayed the same or decreased were more likely to say that digital imaging had given them more time to spend on content and on journalistic tasks. The third, negative-impact, factor correlated somewhat with the shift of work to production departments (r=.18, p=.006) and to the newsroom (r=.22, p=.001). This result suggests that photo editors who say that work has shifted from photo to other departments are concerned about a loss of control.

Table 7 shows that the estimated time spent on computer tasks (from the task-inventory questions) correlates most highly with greater flexibility in use of images and with greater production priority. There are no significant correlations between the time spent on computer tasks and time photo editors say is available for content and on journalistic tasks. These correlations suggest that computerization is seen as increasing production responsibilities and routinization of the job but at the same time as providing greater autonomy and flexibility and some content improvement.

Also, virtually no relationships were found between the impact statements and size of paper. Only routinization showed a significant difference between means, with smaller papers saying that photo work after digital imaging was more routine.

## Conclusion

Digital imaging indeed does offer photographers and photo editors a flexible new tool for doing their jobs, but it also means that they have taken on added production burdens. Digital imaging, much as other news production tools, is not workload-neutral from the perspective of the editorial department. Photo editors say that workload is greater with digital imaging and that staffing has not kept pace. They also say that production has become a higher priority, but unlike copyeditors' experience with pagination, photo editors appear to believe that their departments have enough time to spend on content and on journalistic tasks.

It also seems clear that photo editors associate digital imaging with production rather than with content In one sense, this is no surprise – digital imaging is clearly part of the photo production/reproduction process. In another sense, however, it is important to note the strength of the association between digital imaging and production, the relationship between production and increased workload and the fact that relatively few papers added staff members as a result of digital imaging. Digital imaging is new enough that it is exciting, and there's a sense among photographers that they need to get up to speed on those skills to ensure that they will be able to advance in their careers. But doing more with less over an extended period may exact a price – in burnout and attrition.

Newspaper work has always been both journalism and production. In the time of Ben Franklin, when printers were journalists, there was little distinction between production and journalistic tasks. Later, as technology changed and newspapers grew in size and complexity, the distinction between journalism and production was institutionalized in departments and often spelled out in union contracts. With computerization, the tasks began to coalesce again, as managers moved production work into newsrooms and eliminated back-shop workers. Digital imaging appears to continue that trend, and though the impact appears to be somewhat similar to that of a predecessor news production technology, pagination, it appears to be less problematic in terms of time and quality issues. Photo editors do have some level of ambivalence toward this news production tool, but they do not appear to be critical of its impact on the quality of their work.

Digital imaging further muddies the traditional distinction between journalism and production. Photo editors do apparently make some distinctions between journalism and production, but those distinctions seem to be blurring, just as they have become blurred for others in the newsroom. What is a journalistic task? What is a production task? Is flexibility in image handling a content consideration, a production consideration or both?

Perhaps it is not as easy to separate traditional production tasks and journalistic tasks in photography as is has been with pagination. In pagination, editors sketched page dummies and the back shop cut and pasted to implement the editorial decisions. In photography, much of the processing had already been done by photographers

Photo editors appear to accept the technology and see it as largely positive, perhaps because photo departments traditionally have had a more technical, production-oriented, role and have an easier time accepting production responsibilities as part of their job. Perhaps, as with pagination, photo editors are willing to accept greater production responsibilities and greater routinization of their work because digital imaging gives them much greater flexibility in working with images and greater control of those images.

Redefinition of production as journalism in itself may not be a problem. It can become a problem if attention paid to journalism diminishes because production becomes a greater priority.

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[1] Photo editors ranked digital imaging know-how second only to a good portfolio in hiring criteria; they ranked it higher than an internship, a journalism degree, chemical darkroom skills and good grades. John Russial and Wayne Wanta, "Digital Imaging and the Hiring and Training of Photojournalists," forthcoming, Journalism and Mass Communications Quarterly

[2] Russial and Wanta, "Digital Imaging and the Hiring and Training of Photojournalists."

[3] John Russial, "Pagination and the Newsroom: A Question of Time," Newspaper Research Journal, Winter 1994, 91-101; Doug Underwood, C. Anthony Giffard and Keith Stamm, "Computers and Editing: The Displacement Effect of Pagination Systems in the Newsroom," Newspaper Research Journal, Spring 1994, 116-127; Keith Stamm, Doug Underwood and Anthony Giffard, "How Pagination Affects Job Satisfaction of Editors," Journalism and Mass Communication Quarterly , Winter 1995, 851-862. Russial, "Computers, Ambivalence and the Transformation of Journalistic Work," paper presented to the Communications Technology and Policy Division of the Association for Education in Journalism and Mass Communications, August 1995, Washington, D.C; Russial, "Pagination and the Newsroom: Great Expectations," doctoral dissertation, Temple University, 1989; Ann Brill, "Pagination and the Newsroom: A Study of Implementation of New Technology," doctoral dissertation, University of Minnesota, 1994.

[4] George Garneau, "Picture Desk Update," Editor & Publisher, Feb. 24, 1990, 1P; Jim Rosenberg, "Wirephoto Update," Editor & Publisher, March 14, 1992, 3P, 31-33P.

[5] Sheila Reaves, "What's Wrong with this Picture? Daily Newspaper Photo Editors' Attitudes and Their Tolerance Toward Digital Manipulation," Newspaper Research Journal, Fall 1992/Winter 1993, p. 131-155; and Tom Wheeler and Tim Gleason, Photography or Photofiction: An Ethical Protocol for the Digital Age, Visual Communication Quarterly, January 1995, S8-12.

[6] Russial and Wanta, "Digital Imaging and the Hiring and Training of Photojournalists."

[7] John Russial, "Pagination and Digital Imaging: A Contrarian Approach," Newspaper Research Journal, Fall 1995, 42-56.

[8] See, for example, Mary Jo Moss, "Lost Among the Pixels: Who's Minding the Store," News Photographer, February 1994, 10-11; Sean Callahan, "The Next Big Picture," American Photographer, May/June 1994, 57; Steve Dozier, "Enough With Technology," Editor & Publisher, Sept. 4, 1993, p. 9.

[9] Russial, "Pagination and the Newsroom: Great Expectations."

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[10] Stamm, Underwood and Giffard, "How Pagination Affects Job Satisfaction of Editors."

[11] Russial, "Pagination and the Newsroom: A Question of Time"; Brill, "Pagination and the Newsroom: A Study of Implementation of New Technology"; Carl Sessions Stepp, "Editor Meltdown," American Journalism Review, December 1993, 27-30; M.L. Stein, "Joys and Sorrows of Pagination," Editor & Publisher, Dec. 24, 1994, 24-25; David Cole, "Pagination Page by Page," presstime, February 1995, p. 29; Jane Harrigan, "Why Do So Many Editors Have Such Bad Attitudes?" Quill, March 1993.

[12] Barbie Zelizer, "Words Against Images: Positioning Newswork in the Age of Photography," in Hanno Hardt and Bonnie Brennan, eds., News Workers, (Minneapolis: University of Minnesota) 1995.

[13] Mary Jo Moss, "Lost Among Pixels: Who's Minding the Store."

[14] Jim McNay, "The Importance of Content, Content, Content," Visual Communication Quarterly, Fall 1995, p. 3.

[15] Quoted in Steve Dozier, "Enough With Technology," p. 9

[16] Mark Toner, "Photo Realism," presstime, October 1997, 36-43, p. 42.

[17] Post to JOURNET, Dec. 6, 1996, by George Frajkor, Carleton University School of Journalism. Used with author's permission.

[18] Paul Lester, "Changes Ahead: Visual Reporting vs. Photography," News Photographer, August 1995, p. 15. Also, Bryan Grigsby, "'96 Year of Gloom, Doom?" News Photographer, January 1996, 12-13; "End of an Era Ceremony at Star Tribune, Minneapolis," News Photographer, October 1995, p. 20.

[19] See, for example, Karen E. Becker, "To Control Our Image: Photojournalists and New Technology," Media, Culture and Society, 1991, 381-397.

[20] William S. Solomon, "Technological Change in the Workplace: The Impact of Video Display terminals on Newspaper Copy Desk Work," dissertation, University of California, Berkeley, 1985.

[21] Brill, "Pagination and the Newsroom: A Study of Implementation of New Technology."

[22] Underwood, Giffard and Stamm, "Computers and Editing: The Displacement Effect of Pagination Systems in the Newsroom."

[23] Stamm, Underwood and Giffard, "How Pagination Affects Job Satisfaction of Editors."

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[24] Charles Derber, ed., Professionals as Workers, 1982, (Boston: G.K. Hall); See also Stanley Aronowitz and William DiFazio, The Jobless Future, (Minneapolis: University of Minnesota Press), 1994; Robert A. Rothman, "Deprofessionalism," Work and Occupations, 1984, Vol. 11, 183-206.

[25] Sociologist Daniel Bell, computer scientist Herbert Simon and other information society theorists argue that advanced technology benefits workers by eliminating unskilled, tedious jobs and providing in their place jobs that offer greater variation and greater opportunity for meaningful work. See Daniel Bell, 1973, The Coming of Post-Industrial Society, (New York: Basic); Herbert A. Simon, 1979, "What Computers Mean for Man and Society" in John Burke and Marshall Eakin, Technology and Change, (San Francisco: Boyd & Fraser), 68-76. Flexible specialization theorists adopt a similar view of technology enhancing skills. See Michael Piore and Charles Sabel, The Second Industrial Divide, (New York: Basic) 1984.

[26] Harry Braverman, Labor and Monopoly Capital: The Degradation of Work in the Twentieth Century, (New York: Monthly Review Press) 1974; Harley Shaiken, Work Transformed: Automation and Labor in the Computer Age, (New York: Holt, Rinehart & Winston), 1984.

[27] Shoshana Zuboff, In the Age of the Smart Machine, (New York: Basic) 1988.

[28] Zuboff, In the Age of the Smart Machine, p. 393.

[29] This is an acceptable rate, according to Earl Babbie, Survey Research Methods, (New York: Wadsworth) 1973.

[30] Russial, "Pagination and Digital Imaging: A Contrarian Approach."

[31] Stamm, Underwood and Giffard, "How Pagination Affects Job Satisfaction of Editors."

[32] Some papers use the Leaf Desk for image processing as well as editing, but the vast majority use Photoshop because of its flexibility. See Russial and Wanta, "Digital Imaging and the Hiring and Training of Photojournalists."

[33] This finding also raises questions about the wisdom of having photojournalism students spend much time making prints.

[34] Stamm, Underwood and Giffard, "How Pagination Affects Job Satisfaction of Editors."

**Table 1. Task inventory: How much time photographers spend on different tasks.**
(Scale: (5) = >4 hours); (4) = 2-4 hours; (3) = 1-2 hours; (2) <1 hour; (1) = None)

| Task | Mean time per day | Approx. hours per day |
|---|---|---|
| Shooting photos | 4.50 | 3+ |
| Using a computer | 3.63 | 2+ |
| Using Photoshop | 3.36 | 2+ |
| Scanning | 3.29 | 2+ |
| Using the Leaf desk | 2.35 | 1 |
| Editing photos | 2.89 | 1+ |
| Planning and scheduling photos | 2.87 | 1+ |
| Developing film | 2.44 | 1 |
| Attending meetings | 2.42 | 1 |
| Troubleshooting, upgrading systems | 1.81 | <1 |
| Using a photo archive | 1.68 | <1 |
| Laying out pages | 1.67 | <1 |
| Training | 1.61 | <1 |
| Using a digital camera | 1.54 | <1 |
| Using the web | 1.37 | <<1 |
| Printing photos | 1.34 | <<1 |

**Table 2: Percent of photo editors estimating shift of workload between departments**

| | No shift of workload | Shift of 1-10% of workload | Shift of 11-50% of workload |
|---|---|---|---|
| **Production to photo** | 21 | 17 | 45 |
| **Photo to production** | 64 | 17 | 15 |
| **Photo to newsroom** | 64 | 25 | 10 |

Rows do not add to 100% because some respondents estimated shifts of more than 50%.

**Table 3. Workload change in photo department and years of newspaper experience with digital imaging.** (Percentage of photo editors responding)

| | 1-2 years | 3-4 years | 5 or more | Total |
|---|---|---|---|---|
| Increased | 11.2 | 29.9 | 25.2 | 66.3 |
| Same or decreased | 4.6 | 15.8 | 13.0 | 33.6 |
| Total | 15.8 | 45.7 | 38.2 | 100 (n=214) |

Chi-square = .330, p = .847

**Table 4. Perceived change in workload after digital imaging by size of newspaper**

| | <25,000 | 25-75,000 | >75,000 | Total |
|---|---|---|---|---|
| Increased | 28.0 | 26.6 | 11.1 | 65.7 |
| Same or decreased | 20.4 | 10.2 | 3.5 | 34.2 |
| Total | 48.4 | 36.8 | 14.6 | 100 (n=225) |

Chi-square = 6.106, p = .047

**Table 5. Change in photo staffing after digital imaging by size of newspaper**

| | <25,000 | 25-75,000 | >75,000 | Total |
|---|---|---|---|---|
| Increased | 11.2 | 10.7 | 7.1 | 28.6 |
| Same or decreased | 37.2 | 26.4 | 7.6 | 71.3 |
| Total | 48.4 | 37.1 | 14.7 | 100 (n=223) |

Chi-square = 7.96, p = .018

**Table 6. Statements about digital imaging impacts and factor loadings.**

| | Factor 1 pos./neg. | Factor 2 positive impact on time | Factor 3 negative loss of control |
|---|---|---|---|
| Impact | | | |
| Photogs. have more flexibility | .741 | ---- | ---- |
| Production is a higher priority | .719 | ---- | ---- |
| Content has improved | .621 | ---- | ---- |
| Photogs. interact more with others | .613 | ---- | ---- |
| Photo work is more routine | .540 | ---- | .448 |
| Photogs. have more opportunities | .535 | .544 | ---- |
| Photogs. have more autonomy | .496 | .523 | ---- |
| Deadlines have improved | ---- | .546 | ---- |
| More time for content | ---- | .875 | ---- |
| More time for journalistic tasks | ---- | .862 | ---- |
| Photogs. face more limits on work | ---- | ---- | .808 |
| Photogs. have less control | ---- | ---- | .773 |
| Reproduction quality is worse | ---- | ---- | .660 |
| Desk editors have greater control | ---- | ---- | .574 |
| Percent of variance | 31.8 | 16.9 | 8.3 |

Table 7. Correlates of selected impacts and time spent on computer tasks.

| | Time spent on computer | | Time spent scanning | | Time spent on Photoshop | |
|---|---|---|---|---|---|---|
| | Corr. | p | Corr | p | Corr | p |
| Greater autonomy | .1916 | .004 | .2190 | .001 | .1965 | .003 |
| Greater flexibility | .1937 | .004 | .2758 | .000 | .3312 | .000 |
| Content improvement | .1295 | .052 | .1480 | .026 | .1586 | .017 |
| More routine | .1827 | .006 | .1600 | .016 | .1088 | .104 |
| More limitations | -.0338 | .614 | -.0672 | .316 | -.1302 | .051 |
| Greater editorial control | .0527 | .432 | .1705 | .010 | -.0103 | .878 |
| More time for content | -.0136 | .840 | -.0244 | .716 | .1182 | .077 |
| More time for journalism | -.0037 | .956 | .0344 | .608 | .1023 | .126 |
| Production a higher priority | .2507 | .000 | .2582 | .000 | .2849 | .000 |

# The Convergence of the Web and Television: Current Technological Situation and its Future

**Seungwhan Lee**

Ph.D. Student
Department of Telecommunications
Indiana University

Redbud Hill Apt 1501
Bloomington, IN 47408
Phone: (812) 857- 1806
E-mail: swlee@indiana.edu

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ABSTRACT

# The Convergence of the Web and Television: Current Technological Situation and its Future

This paper attempts to conceptualize the convergence of the World Wide Web and television broadcasting. For this purpose, the paper explains the possibilities for convergence using McQuail's four patterns of information traffic and Hoffman and Novak's media typology. Then the study compares three current forms of convergence such as "WebTV," "Intercast," and "Webcasting," focusing on comparing the technological advantages and disadvantages of each technology. Using Cherry's "liberties of action" concept, the last part of the paper discusses the future of Web broadcasting.

# The Convergence of the Web and Television: Current Technological Situation and its Future

## I. Introduction

Since the advent of the World Wide Web on the Internet, technological developments in both hardware and software have made it possible to deliver television broadcasting via the Web as well as the Web via television broadcasting. This clearly indicates the possibility of "convergence" of the Web and television. This phenomenon is reflected in new buzzwords such as "WebTV," "Intercast," and "Webcasting." Because there are currently several types of convergence, this paper will use "Web broadcasting" as a generic term for convergence.

Web broadcasting is one of the most desired new communication technologies in media history. By making both audio and video that is accessible to everyone on the Internet, each individual's Internet connection can virtually become a separate channel. This means that Web broadcasting could be the most personalized program service imagined thus far. However, Web broadcasting cannot yet achieve full-blown service in the near future because some technological problems and other factors still exist which will significantly affect its future direction.

The main purpose of this paper is to try to conceptualize the convergence of the Web and television broadcasting. For this purpose, the paper first introduces McQuail's four patterns of information traffic and Hoffman and Novak's media typology, and applies them to the Web. It then surveys the current state of Web broadcasting technologies, focusing on comparing technological advantages and disadvantages of the three convergence technologies present in the market right now. The last part of the paper discusses the future of Web broadcasting using Cherry's typology "liberties of action" concept.

## II. Conceptual mapping for the Internet and the Web

As new communication technologies have emerged in our society, they have attracted the attention of many communication scholars who have also tried to explain the nature of these new media in their theoretical frameworks.

Rogers (1986) is one of the first communication scholars who attempted to figure out the characteristics of new communication technologies. He suggests three characteristics of new media which distinguish them from existing mass media: interactivity, de-massification, and asynchronousness. Though his explanation is made before the wide diffusion of the Internet, it gives us important implications for the Internet. It is clear that the Internet is believed to possess all three of the characteristics of new media.

At almost the same time, McQuail (1987) also attempts to conceptualize new media. He uses two main features of communication flow for his framework. One feature is the storage of information, and the other is the access, or use of information. From these two features, he categorizes communication flow into four patterns: allocution, conversation, consultation, and registration.

**Table 1: Four Patterns of Information Traffic**

| | Information Store | |
|---|---|---|
| | *Central* | *Individual* |
| Control of time & choice of subject: *Central* | ALLOCUTION | REGISTRATION |
| Control of time & choice of subject: *Individual* | CONSULTATION | CONVERSATION |

Source: D. McQuail, *Mass communication theory: An introduction* (2nd ed.). (Beverly Hills, CA: Sage, 1987).

First, according to McQuail, "allocution" means the simultaneous transmission of a centrally constituted "offer" of information intended for immediate attention, according to a centrally determined time scheme. Second, "conversation" is the exchange between individuals of information already available to them, according to a mutually convenient time scheme. Third, "consultation" means the selective consultation by individual participants of a central store of information at times determined by each individual. Fourth, "registration" means the collection in a central store of information, available to, or about, individual participants, according to a centrally determined choice of subject and time.

Though McQuail does not apply his typology to the Internet, his model of four modes of communication can be applied to Internet communication. He claims that the potential of new media is to increase the possibilities for consultation, conversation, and registration modes of information traffic. In this sense, he claims that the Internet would be the most suitable communication media because it has the most promising capacities.

The existing broadcasting system only follows the allocution mode of information flow. The broadcast station has the power to decide what kinds of programs (information) to offer and when the programs will be sent to the mass audience, while the audience has no choice but to watch them without any control over the contents or time of the programs.

In contrast, the Internet can be interpreted as weakest in the allocution mode and was thus considered the most inappropriate medium for mass communication when the Internet first came into being. Though the Internet can carry information to many people at the same time, it is difficult for the Internet to deliver information as widely as existing broadcasting does, mainly due to the Internet's architecture. Basically, the Internet is designed to perform point-to-point data transmission. This places the Internet at a disadvantage for functioning as a mass delivery medium when it has to transmit information to multi-points, especially simultaneously. However, this disadvantage is being overcome by MBone technology, which enables the Internet to deliver the same data to wide end-users simultaneously.

Accordingly, at first glance, the Internet has more of the characteristics of the other three modes than the allocution mode. The conversation mode is possible for the Internet when we think about its on-line chatting service. Furthermore, e-mail and Usenet services can be understood as this mode when we think about the fact that they are used as personal communication channels at the individual's own convenience.

The File Transfer Protocol (FTP) service of the Internet would be best suited for consultation mode. Usually, the FTP service is used when educational or research institutions, highly centralized organizations, post their files (data) on their main computers and the users access and download them through the Internet.

The registration mode is difficult to discover among Internet services; as McQuail explains, this mode is rarely found in public communication. He states that the registration pattern is a long-established element in many organizations for record-keeping, control, and surveillance. However, this mode can be interpreted, not as a specific service, but as a characteristic of Internet communication itself. Whenever one uses any Internet services, it is almost impossible for one's Internet usage history not to be traced. This characteristic of Internet communication is an example of "central recording by computer of all uses of information media connected to a system."

Introduced to the Internet community in 1991, the Web would become the most interesting of the many services available through the Internet. According to Hoffman and Novak (1995), the Web represents the "universe of network-accessible information, an embodiment of human knowledge in hypertext and multimedia form." They especially emphasize that the Web is the first example of a hypermedia computer-mediated environment that makes it possible for users on the Internet to search, retrieve, browse, and add information to the environment at will. Their explanation implies that the Web has the potential of being used as all four of the patterns of information traffic McQuail categorizes.

In this context, Hoffman and Novak (1995) actually attempt to make a perceptual map of 35 media types ranging from traditional mass media such as radio, TV, and newspapers, to various Internet services including e-mail, Usenet, and the Web. They use the multi-dimensional scaling method to find similarities and differences among media used in our society. With regard to the Web, their media typology reveals an important fact about its characteristics as a medium. According to their results, the Web with video is positioned in the middle of all 35 forms of media, which means that the Web includes most of the typical characteristics of all communication media available to us until now.

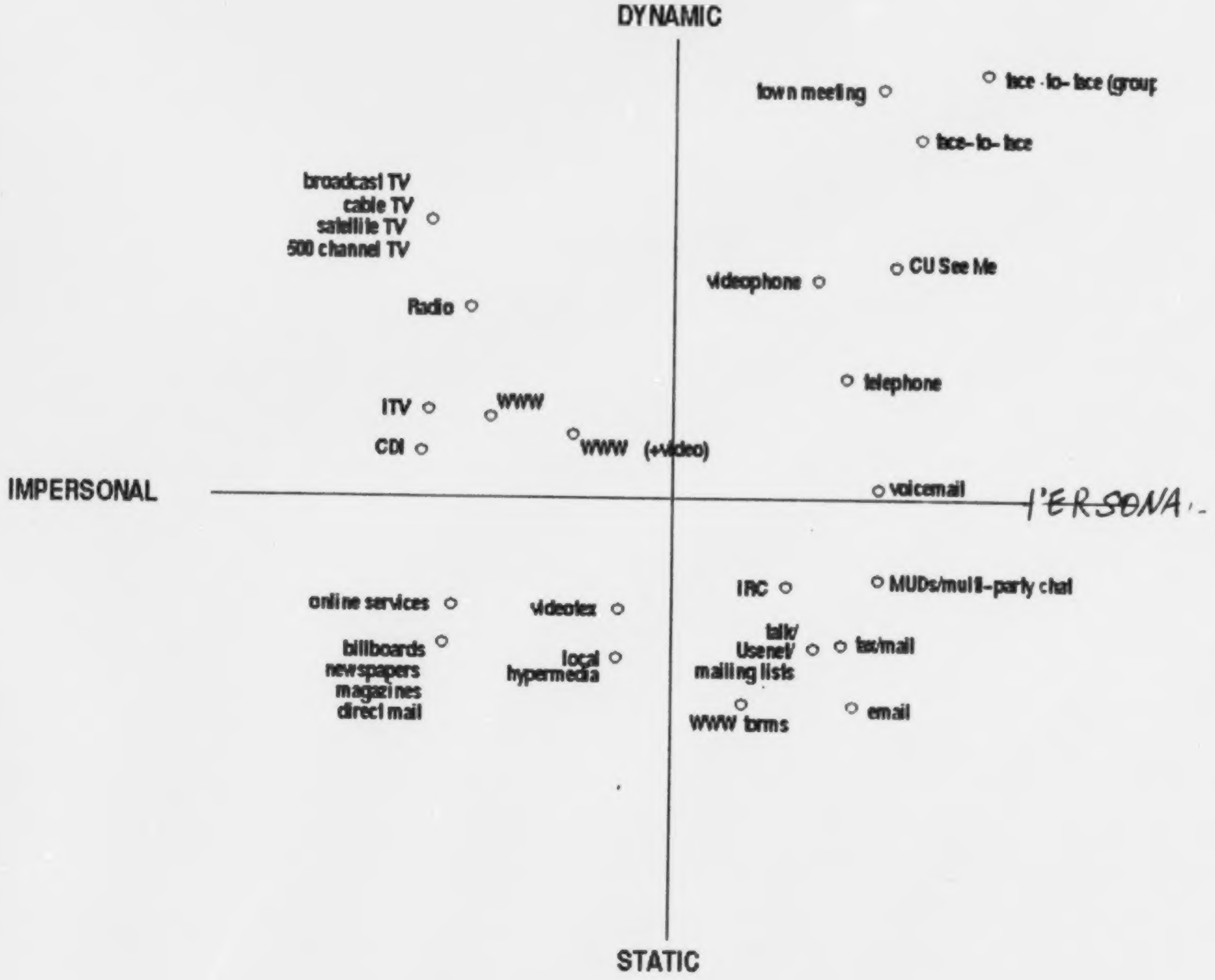

Figure 1: Media Typology Based upon Objective Characteristics

Source: Hoffman, D. L. & Novak, T. P. (1995). *Marketing in hypermedia computer-mediated environments: Conceptual foundations.* [http://www2000.ogsm.vanderbilt.edu/cmepaper.revision.july11.1995/cmepaper.html]

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## III. Liberties of action

As soon as the Web appeared in the Internet, it became a juncture for the convergence between the Internet and broadcasting. Because of its potential impact on the future of human communication modes, Web broadcasting requires the special attention of communication scholars. Cunningham and Finn (1996) argue that to comprehend various forms of convergence is the main challenge which established media theory faces. In this sense, Cherry's "liberties of action" concept can help us understand convergence and predict its future.

Sawhney (1996) develops the "metaphor" approach as a useful explanatory tool for predicting the future of a new system or technology in our society. He argues that this approach is especially strong when the situation is very uncertain, and also claims that the influence of metaphors can be best understood through the concept of "liberties of action."

Cherry (1977) utilizes this concept to explain the impact of new communication technologies in our society. He claims that each technology offers freedom of movement along a certain dimension. The concept is not restricted to movements in a physical sense but includes all capabilities that extend human control over our environment. Thus, the concept implies that each innovative technology in our society adds a new dimension of freedom for people. Though he does not explicitly define the term, he suggests liberties of action as a tool for forecasting technological change.

Sawhney (1996) further argues that a metaphor based on an old technology has the greatest impact on the emerging technology when they both have similar liberties of action. However, according to him, there are limits to the influence of metaphor on the development of a new technology. He defines these limits as "zone of influence." The zone of influence is a "function of the relationship between the two technologies -- old and new -- that form the basis of metaphor."

The central position of the Web in Hoffman and Novak's perceptual map research implies that, so far, the Web provides the most liberties of action available now. This means that the Web can provide not only as personal communication channels like e-mail, but also mass delivery channels like television or newspaper. The real technological advantage of Web broadcasting comes from the fact that it can deliver programs to a wide variety of audiences and cater to each individual's need using the interactivity of the Web at the same time. Thus, it is natural that Web broadcasting appeared as soon as the technologies required for convergence became available. Web broadcasting will be the first unique communication mode to cover all four of the information flow patterns which McQuail (1987) suggests.

## IV. Web broadcasting technologies

Why has Web broadcasting emerged as a sudden phenomenon, and, at the same time, become such a flourishing service right now? This question can be answered both in technological and economic aspects.

First, the Internet has been developed as basically a "template" technology. The importance of a template technology lies in its openness to real usage. A template technology allows for application in many directions. The personal computer (PC) is a good example: the real use of the PC is not decided by the physical specification of the PC, but by what kind of application programs are used on it. The same is true with the Internet, but there is a big difference between the PC and the Internet. While the PC is a "stand-alone" platform, the Internet is an "interconnected" platform. This implies that the Internet can add interactivity to its liberties of action.

Actually, the early history of the Internet shows that it incorporates every innovative service imagined. Basically, the Internet can be understood as a channel that carries data from one point to another. Thus, the data carried constitutes several services. So, the Internet system itself is meaningless to general users. Users only enjoy the specific services that Internet communication brings. This technological characteristic greatly raises the number of possible services the Internet can provide. Accordingly, this fact enabled innovative amateurs of the early Internet days to introduce the new Internet services that we enjoy today. As Douglas (1986) shows, just as in radio, where the impact of early amateurs on the future direction of the radio business was great, some creative Internet users were quick to realize the potential of the open platform of the Internet. They first introduced voice transmission over the Internet and then video transmission later. This provided the basic starting point for the Internet to become a broadcasting medium. They were the first ones to realize the possible liberties of action and to bring them to the Internet.

Ever since the Internet's potential as a broadcasting medium was discovered, the pace of technological development has been fast enough to exceed some experts' predictions. One of the two main reasons is the fact that the Internet has been developed exclusively as digital technology -- the winner in the world of communication technology. This means we have far more advanced data transmission capability now than when analog was the dominant technology. Both radio and television broadcasting use spectrum, based on the analog technology. In contrast, the Internet was exclusively developed for communication between computers, meaning digital technology. Digital technology gives the Internet much more flexibility and many more advantages than analog technology. This is why Gilder (1992) is so confident in his prediction of the advent of the "teleputer."

Second, today's most sophisticated providers of video contents -- broadcasters, film makers, and advertisers -- want to use the Internet as an additional outlet for their contents in order to reach to a wide variety of target audiences. They believe that there exists a great potential demand from television audiences for more sophisticated interactive services. Traditional broadcasting organizations especially want to maximize their revenue through participating in these new business opportunities. With vast resources at their fingertips, such as experience in producing contents and in dealing with audiences, they want to expand their market through Web broadcasting. Therefore, they have given much effort to developing new Internet services. For example, the Sony Station[i] has begun to offer online Jeopardy[ii] and Wheel of Fortune.[iii] All these services using the Internet's interactivity are not possible through the existing broadcasting system. Content providers like Sony want to increase their existing program value by adding new formats and delivery channels.

Web broadcasting came into being because both the technological and economical situation met. When we think of the ways two technologies, A and B, meet with each other, there are three possibilities: a mere combination of A and B, A incorporating B, and B incorporating A. These relationships can be applied to the way the Web and television broadcasting meet. As a natural consequence of this logic, all three ways of convergence between the Web and television already exist.

In one relationship, neither the Web nor television technology dominates, such as in "WebTV." In another, broadcasting can incorporate Web technology into its own technology. Intel's "Intercast" technology is based on this relationship. In a third relationship, the Web incorporates broadcasting technology into its own technology. Recent attempts to broadcast through the Web, widely called "Webcasting," represent this relationship.

### 1. WebTV - Mere combination of the Web and TV

The company named WebTV Network pioneered the combination of the Web and television broadcasting. Their idea was to show the Web on the existing TV screen without a PC. Thus, they devised a WebTV set-top box which enables a television set to display Web and e-mail services using existing telephone lines and modems in their set-top box.

However, WebTV is a mere combination of the Web and television technologies. Even though the two technologies are combined, technologically WebTV is a "toggle" combination. Users can enjoy only one technology at a time, TV or the Web. The two technologies are just coexisting in WebTV and cannot affect each other's operation.

WebTV has several advantages. First, it does not need a PC to show the Web, so it is cost-effective. Second, Web surfing can be a user-friendly service, according to the WebTV Network, because it provides specially designed Web services to its subscribers.

On the other hand, WebTV has disadvantages. First, because the Web and e-mail services are shown on existing television sets, the quality of television screens causes eyestrain problems with text information. Second, because WebTV does not use a PC, there are limitations for some Web services like file downloading, which is only possible on a PC. Third, WebTV requires subscription to the WebTV Network with $20 per month subscription fee.

### 2. Intercast – the Web through TV

Another convergence of the Web and television broadcasting occurs when television broadcasting delivers Web information. The giant computer chip maker, Intel developed Intercast technology that uses Vertical Blanking Interval (VBI), a dead television signal zone which separates each television channel using 6 Mhz, enabling broadcasters to deliver Web contents they have prepared for their audience. Before the advent of Intercast, VBI had been used for closed-captioning, teletext, and clock-setting signals for VCRs. Intercast allows Web pages to be transmitted as part of the standard television signals from broadcasters and cable networks. The HTML document data is inserted into VBI. Users of Intercast have to install an additional card in their PCs in order to receive VBI signals for Intercasting and can watch the television programs with Web pages the broadcasters deliver on their computer monitors.

There are several advantages of Intercast technology. First, because the Intercast reception card processes television and VBI signals separately, viewers can enjoy TV programs and Web contents simultaneously on the same computer monitors. Second, using VBI signals, broadcasters can deliver Web contents much faster -- at a maximum speed of about 100 kbps -- than WebTV set-top boxes which use ordinary telephone lines and 33.3 kbps speed modems. Third, Web contents delivered through VBI are saved on the users' hard disk. Once downloaded, the Web contents can be retrieved almost instantaneously with the click of a mouse. Fourth, right now all Intercast services are free because broadcasters want to raise ratings with Intercast services.

However, Intercast has a serious problem with interactivity. Because Intercast signals are delivered in addition to television signals, Intercast requires users to have additional Internet access, usually subscribing to an Internet service provider, in order to enjoy the interactivity of the Web.

### 3. Webcasting - TV through the Web

The third type of convergence is the incorporation of broadcasting into the Web. Though there exists no fixed term for this type of convergence, it is most frequently refered to as "Webcasting." From a technological point of view, the advent of

Webcasting began with the coming of "streaming" technology in the mid 1990s and with its incorporation into the Web. ProgressiveNetwork (now RealNetwork) introduced Real Audio, the first streaming technology for audio, in April 1994. Before that time, users had to wait for an entire file to be transferred before using networked multimedia content. However, streaming technologies let users hear and see the information as it arrives, without having to wait.

Webcasting can be considered to have more liberties of action than the two other types of convergence, WebTV and Intercast. First, Webcasting can use the interactivity of the Web. It provides either "24 hour" streaming or "on-demand" streaming services. While 24 hour streaming is like TV broadcasting, on-demand streaming is similar to a VCR. 24 hour streaming is the same as live broadcast, except the signal goes out over the Internet instead of the air. When a user clicks on the stream, he or she is taken to a live broadcast program which can be seen with a traditional television set simultaneously. In the case of on-demand streaming, the on-demand files are also always available to users, but they do not start streaming (playing) until the user clicks on them. In addition, when the user clicks, he or she can go to specified points in the streaming, similar to hitting the fast forward and rewind buttons on a VCR. Second, Webcasting has the potential to be a "World Wide Television" service. Because Webcasting uses the Internet as a delivery vehicle, there are virtually no geographical boundaries to Webcasting service. Third, Webcasting can make the most of the Web because it is a seamless convergence between the Web and broadcasting. For example, Webcasting can be used as an electronic shopping service combining the interactivity of the Web and live television broadcasting.

However, Webcasting has two disadvantages right now. First, because Webcasting depends entirely on the Internet, the current slow speed of the Internet is a critical drawback to Webcasting service. Due to the slow speed of the telephone lines which most users use as their Internet access, Webcasting only delivers small, jerky television pictures. The picture quality in Webcasting cannot match WebTV and Intercast, which display the maximum television picture quality. In order to solve the slow speed problem, several technologies -- including cable modems, wireless modems, satellite delivery, and faster line services such as ISDN or ADSL -- are now competing for the final solution.

The second major disadvantage of Webcasting is that it has no established standard. This could be a critical problem for full-fledged Webcasting service. Rosen et al. (1988) cite the advantage of setting a standard as the acceleration of the diffusion of technological products. They claim that standards reduce risks for market entrants by negating the prospect of product obsolescence, reducing further research and development costs, reducing the risks for consumers of ending up with an orphaned product, and increasing competitiveness in international markets.

Their explanation can be applied to the current Webcasting situation. If the industry cannot reach a standard for Web broadcasting, this could become a major barrier to the rapid diffusion of Web broadcasting. Webcasters may be reluctant to invest full-scale without the confidence that their choice of Web broadcasting systems will not be an orphan in the market. Users will also hesitate to buy any Web broadcasting software and/or hardware systems. Though currently most streaming software is freeware which can be obtained through the software developers' Web sites, users of streaming technology do not like the fact that they must download new streaming software whenever they find a new type of streaming. The current situation fails to create a de facto standard for Web broadcasting. The early history of television (Udelson, 1982) and the recent HDTV standard-setting process show that industry standards are not easy to achieve.

## V. Future of Web broadcasting

Many experts have made predictions about the future of Web broadcasting. However, nobody can tell the future with confidence due to the following reasons.

First, the technological environment of Web broadcasting is changing so fast that it is almost impossible to tell the direction of future technology. New convergence technologies are still being developed and are likely to appear in the market. If a new one proves to be superior to those already existing, it can easily dominate the Web broadcasting market.

Special attention should be given to HDTV. On April 3, 1997, the FCC allocated spectrums for the Advanced Television (Lieberman, 1997). The first Advanced Television sets will be on the market by the end of 1998. Some Advanced Television Systems Committee (ATSC) Standards[iv] are compatible with computers. Therefore, it is inevitable that Advanced Television has great potential effects on the future direction of Web broadcasting.

Second, the role of content providers for Web broadcasting is not clear right now. Their influence on the future course of Web broadcasting development is great if we consider that most giant program providers want to participate in this new business. Microsoft's recent buying of WebTV Network[v], the WebTV service provider, shows this trend clearly. Companies from various backgrounds have just started to invest huge amounts of money in the potential of Web broadcasting.

At present, all possibilities are open for Web broadcasting technologies. However, the chances are that the technology which can give the most liberties of action will have better opportunities to lead the future of Web broadcasting. In addition, the competing convergence technologies may exist together without disappearing in the market, each due to its own technological advantages.

Based on the discussion of technological strength and weakness, Webcasting is more likely than WebTV and Intercasting to be the leading convergence technology in the future. Webcasting can provide live and/or video-on-demand services, reach a vast area of the world instantly through the Internet, and also provide seamless interactive service only possible in Webcasting. In addition, because streaming technologies and methods of enhancing the Internet transmission speed are just at their initial stages, there is a great possibility that there will be technological breakthroughs in Webcasting technology. Right now, the field is open for all streaming technologies and Internet transmission modes to prevail in the future Webcasting era.

If the technological problems of Webcasting are overcome and it becomes a full-blown service, this means the advent of a new medium which promises the most liberties of action. Though barriers such as language, national governments' restrictions on foreign programs, or limitations on international transactions like electronic pay-per-view payments still exist, Webcasting has the potential to be widely used around the world in the near future.

However, a more important factor that will determine the future of Web broadcasting is the users of Web broadcasting. Rogers (1983) emphasizes the importance of "implementation" instead of mere "adoption" of new innovation. This is also true with Web broadcasting; its future will largely depend on how people see, adopt, and use Web broadcasting technologies.

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[i] http://www.station.sony.com
[ii] http://www.station.sony.com/jepardy
[iii] http://www.station.sony.com/pda.dyn
[iv] http://www.atsc.org
[v] http://www.webtv.net

# *On-Line or Off-Base?*

## A Pilot Study to Determine Undergraduate Student Perceptions About Offering A Journalism/Mass Communication Course on the Web

**Submitted to:**
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**Authors:**
Barbara J. DeSanto, Ed.D, APR
J. Steven Smethers, Ph.D.
School of Journalism and Broadcasting
206 Paul Miller Building
Oklahoma State University
Stillwater, Oklahoma 74078
Telephone:(405) 743-2386
Fax: (405) 743-2396
<paradoc@cowboy.net>

## Abstract

### ***On-Line or Off-Base?***

### A Pilot Study to Determine Undergraduate Student Perceptions About Offering A Journalism/Mass Communication Course on the Web

Computer-based distance education is being touted as one of the futurist ways to offer a variety of students courses they otherwise would not be able to take because of distance and/or time. While studies have been done on the designing Internet courses, little has been done to assess student perceptions or preferences about participating in this type of course. This pilot study specifically targets undergraduate communication students to ascertain their reactions to on-line courses in a profession that demands a certain level of social interaction to be successful. This study identifies a number of issues that students identified as important considerations in designing undergraduate Web-based journalism courses.

Distance learning, the concept of providing instruction from a central site to students located at one or more remote locations, has been a buzzword among educators for decades. But in recent years, growing numbers of non-traditional students seeking high school, vocational and college education have made the market flourish. As administrators have sought to maintain or boost enrollment figures or to further expand their institutions' influence into distant regions, they have been forced to make education a more flexible commodity. A decade ago only a handful of states encouraged distance education, but by 1991, nearly every state had inaugurated a formal policy to encourage this type of instruction. This rapid growth was partially necessitated by dwindling state education budgets that made a more parsimonious and versatile form of providing education a necessity, and in this regard, satellite-delivered courses, which allowed for simultaneous transmission of courses to several remote locations, were a Godsend for secondary and higher education institutions struggling to offer diversified education while making financial ends meet (Jordahl, 1991).

More recently, developments in distribution technology have proven to be a stimulus in boosting interest in distance learning. Educators have realized that perhaps the best tool for providing individualized instruction at the lowest cost is literally at their fingertips: the personal computer. The diffusion of PCs that began in the early 1980s paved the way for educators to first experiment with using the computer as an interactive adjunct to satellite-delivered TV courses to provide feedback capabilities between instructors and students (Jordahl, 1991; O'Donnell, 1993).

But visionary schools, such as the New York Institute of Technology, also experimented with offering entire classes by computer as early as 1985. Educators soon discovered that computer-mediated courses offered tacit advantages over other forms of distance learning technology. For one, computer delivery offers greater convenience and flexibility. Students are able to receive instruction at times that better fit their individual schedules, an improvement over the rigid demands of university teleconference schedules and live televised courses that were sometimes offered at odd hours, such as the CBS "Sunrise Semester," which aired daily at 6:00 a.m. [the series was dropped in the early 1980s (Ivey, 1988)]. Computer-mediated courses can more flexibly span time zones, allowing college courses to serve constituents across the country and/or beyond national borders, since international students can receive credit from American colleges without physically attending classes in the United States ("Distance Learning," 1995; DeLoughry, 1996).

The other great advantage touted by proponents is the fact that computer delivery of course material allows interaction among students and between students and professors that is arguably better than conventional forms of distance instruction. Through electronic messaging features such as e-mail and chatrooms, courses can still be heavily discussion oriented, but with the advantage that messages can be accessed and answered at times that more conveniently accommodate the busy schedules of both students and teachers (Monaghan, 1996).

The computer-mediated course concept has grown tremendously since its first inception earlier this decade. Britain's Open University, an institution built on distance education through classes aired on national radio and television, offered nearly 100 on-line courses by 1995 ("Distance Learning," 1995). In New York, the New School for Social Research offers more than 90 diverse courses, ranging from art education to political theory (DeLoughry, 1996). A federal grant has been awarded to the University of Nebraska's Department of Distance Education to develop an entire high school curriculum that would be delivered via the Internet ("Virtual Learning," 1997). Perhaps the greatest effort to promote on-line education as a viable means of distance learning is the "Western Governor's University," a 21-member teaching consortium composed of industrial corporations and universities in the western and southwestern states, which proposes to offer degree and certificate programs. Under this proposal, students enrolled in the WGU program would be entitled to take distance classes offered by participating institutions or they would at least be directed to appropriate electronic courses at other non-WGU colleges and universities nationwide (Blumenstyk, 1998).

Amid the excitement over computer-mediated courses, the concept has also attracted a hefty amount of skepticism. Critics argue that while this approach does make education more accommodating, especially to non-traditional students, its main drawback is the loss of personal, "over-the-shoulder" instruction that is vital to some subjects, a traditional complaint about other forms of distance learning technology ("Virtual Learning," 1997). Quibblers also argue that such essential components of classroom instruction, such as observing students' body language to gauge the degree to which points are being effectively presented, are lost when the student is remotely located at a computer terminal hundreds of miles away (Guernsey, 1998; Norman & Towles, 1994). In fact, the American Federation of Teachers has encouraged members to oppose on-line courses unless teachers can guarantee that the material offered would equal the quality of traditional classroom instruction. The union's task force argues that "shared human spaces of [the] campus [environment]" are an essential component to learning, especially in undergraduate education, and that the virtual community cannot offer students such an experience. The organization has proposed strict standards for evaluating on-line courses, including the mandate that such classes "should be structured to include a substantial amount of interaction among students and between students and the teacher" (Blumenstyk, 1996).

Some critics question whether such meaningful interaction is possible. They contend that if students are relegated to providing feedback to teachers only through e-mail and chatrooms, the quality of such feedback may suffer. Furthermore, the merit of the on-line discussions may be more difficult to assess, since this forum mandates a particular structure under which students may provide their comments, a factor likely to inhibit meaningful, insightful argument, debate or discussion. Some professors of on-line courses already notice that obtaining quality feedback from students is easier said than done, and that graduate students are much more likely to post meaningful comments than are undergraduates (Guernsey, 1998).

AFT members are especially worried that students with limited computer backgrounds would be at a great disadvantage when taking on-line classes (Blumenstyk, 1996). Moreover, some scholars question whether computer-mediated courses can be flexibly structured to accommodate students' varying learning styles or whether all courses are adaptable to the on-line delivery format. Critics caution that on-line classes are often designed around such esoteric topics as "Political Theory for the 21st Century," "Media Manipulation: Resisting Advertising," and "How to Open a Beer Bar or Brewpub" (DeLoughry, 1996). Whether this format is effective for teaching more fundamental courses, even if classes are restructured to better suit the PC delivery technology, is an issue still under question ("On Line," 1998).

The degree to which students are willing to receive education via their PCs may, in fact, loom as the biggest issue shrouding the wholesale adoption of computer-mediated distance courses. Experience in the field indicates that a majority of distance learners come from the ranks of "non-traditional" students, primarily working adults who have been unable to fit the demands of attending classes into their already-tight daily schedules (Bruder, 1989). Previously discussed programs currently being developed by secondary and higher education to increase computer distance education outreach, however, seem to be built on educators' assumptions that high school and college students will be attracted to computer-mediated courses. It could be argued that computer-mediated courses may be a tougher sell among members of this age group. Students who are already a part of campus life may find any aspect of distance learning to be a less-than-adequate substitute for the more personable atmosphere of the conventional classroom. Although virtual classes can be more accommodating to the busy schedules and more active lifestyles of on-campus students, this attribute can also be a disadvantage, since students must be disciplined enough to maintain their on-line class assignments (Guernsey, February 13, 1998). As articulated by a student at the California State University-Humboldt:

> The students' big fear is that we just don't want to be sitting watching a monitor...If I'm going to consider a technologically-based course, it had better be something more...Personally, I don't want to sit in my house taking these classes. I prefer to go to the campus and be in the classroom environment (DeLoughry, 1994, p. A-38).

High schoolers and college undergraduates could reject computer-mediated courses for another reason: technophobia is currently very high among members of this age group. Data from a study by Scott and Rockwell (1997) even suggests that such fears may actually make persons antagonistic toward tasks associated with computers, such as taking courses via computer. Assuming that this finding is correct, proponents of virtual curricula should be concerned, since the perceived ease with which distance learners can access and use technology has traditionally been rated as an important factor among class designers using other modes of delivery (cf., Hawkes, 1996; Stubbs & Burnham, 1990). Apprehension about the conveyance technology itself could emerge as an obstruction to learning in computer-mediated courses, assuming that less computer-savvy students would not already be so intimidated by the technology that they might avoid this method of instruction in the first place.

Designers of virtual curricula would be wise to determine to what extent the concept of computer-mediated courses would be accepted by the heavily targeted high school and undergraduate student populations. To what extent are members of this group willing to take classes by computer in lieu of classroom instruction?

Few, if any, studies have attempted to determine consumer perceptions of on-line courses. Scholars have offered general methods for evaluating and developing more effective distance classes (cf., Hawkes, September 1996; Hawkes, October 1996; Stubbs & Burnham, 1990), a field of literature that provides both a strong theoretical base and prescriptive guidelines for virtual course planners. Earlier outcome-based data also exists to evaluate the effectiveness of courses delivered through other means of distance technology (cf., Whittington, 1987). In terms of computer-mediated courses, the American Association for Higher Education is currently launching an evaluation program to determine the effectiveness of computer technologies in instruction, either when used as an adjunct to classroom instruction or as a means of delivering courses ("On Line," 1998). Perhaps data about the effectivness of on-line instruction will be available in the future, but at present, there is little research in this field. Furthermore, the more basic question of how potential distance learners anticipate receiving instruction via computer is a field of study that scholars have apparently avoided altogether.

The study of journalism and/or mass communication and its related components of advertising and public relations are all by definition based in all communication. The purpose of the journalism, public relations and advertising is to interact with others using communication tools to get across ideas. Two important communication process components, outlined by Claude Shannon and a host of others, include senders and receivers and everything that gets in between the two. This study is an attempt to identify what a new technology, computers and on-line access, suggests for a group of potential users or receivers of communication, undergraduate students. Most of the research done has been directed from the provider, or sender's, point of view; the research done on end-users or receivers has concentrated on graduate and/or non-traditional users, not traditional undergraduate students and not specifically in a profession based on communication skills. This study focuses on their perceptions of moving on-site campus classes from classrooms onto the World Wide Web.

## Methodology

Undergraduate students enrolled in the university's introductory media and society course during a fall and a spring semester were used as the initial population for these interviews. Because the majority of literature about on-line course development focuses on course delivery for non-traditional and graduate students, particularly those not involved or served in traditional on-campus courses, responses from traditional students in the general introductory media and society were sought to suggest ways to begin the study of this large group.

The literature about technophobia, particularly the findings of Scott and Rockwell (1997), provided the basis for developing the following research questions:

- Are you comfortable enough with computer technology to take an entire course on-line?
- In the on-line format, class discussions would be conducted in chatrooms; what are your attitudes about this?
- Because the course is all on-line and all participation is done by writing on the computer, do you think you will have more opportunities to improve your writing skills than in the traditional classroom?
- Is 24-hour-a-day access to course materials , including lectures, and the course instructor using the Web an advantage or disadvantage?
- Is the opportunity to cheat in an on-line course greater than in a traditional classroom-based course?

Students also provided the following demographic information:

- Extent of computer ownership among undergraduate students;

- How many total years of experience each student had with computers;
- Students' self-assessed proficiency level with computers and programs;
- Students' self-assessed comfort level to take an on-line course.

## General Study Participant Characteristics

The majority of students in this study were journalism/mass communication majors; including 18 print journalism majors; 29 broadcast majors; 58 public relations majors; 41 advertising majors; and 26 majors from other fields. Twenty-one of the respondents were freshmen; 39 were sophomores; 65 were juniors; and 45 were seniors. Fifty-eight of the 172 students indicated they owned their own computers.

## Findings

Students were asked about their attitudes toward using chatrooms in place of traditional classroom discussion.

**Table I**
**Traditional Undergraduate Students Perceptions About Chatroom Use In An On-line Course**

| | Favorable | Unfavorable | Mixed | NA |
|---|---|---|---|---|
| Male (70) | 15 | 29 | 25 | 01 |
| Female (102) | 16 | 46 | 36 | 04 |
| Totals (172) | 31 (18%) | 75 (44%) | 61 (35%) | 05 (03%) |

Slightly less than one-half of the students were not in favor of replacing traditional class discussions with chatroom discussion while more than one-third of the students gave the idea mixed reviews.

As reported by Guernsey (1998); Norman & Towles (1994); and Blumenstyk (1996); losing the atmosphere created by direct personal contact and feedback in the classroom and replacing that with chatroom feedback was an often-mentioned concern about on-line courses. Student comments in this study found that: "The essence or spirit in conducting a live discussion session isn't the same using on-line services;" "Correspondence through chatrooms and e-mail also loses the actual human interaction which physical classrooms provide;" "Some of the things I have learned in college I remember only because we had stimulating discussions about them...;" "So many components of communication—tone of voice, nonverbal cues, facial expressions—can be lost when one talks through type;" "I think the worst part of the Internet classes is the professor/student relationship. How would this occur over the Internet?"

A substantial percentage of students, however, cited the use of chatrooms as a positive tool because they felt it would allow them to "express themselves in class without the usual fears of speaking out in class;" "I must admit that I am slightly intimidated by extremely large classes;" "Participating in discussions with a large class can be intimidating. I think people tend to express their opinions more openly on the computer than they do in person;"

Other students felt that not being in the same physical space at the same time was not a problem; "...they (students) would still be able to interact with their fellow classmates and express any feelings of confusion...students could also use the chatrooms as a source of feedback or any new ideas about any of the possible essays or reports due."

Mixed responses centered on the suggestion that chatrooms might not be considered "real" conversation: "I think that it (a chatroom) might be more of an incentive for people that are more shy about talking in class to get involved in a conversation in these chatrooms, but at the same time, there is no real conversation taking place."

Other students questioned the identify of chatrooms participants; "How would you know who is truly doing the conversing in the chatroom?" "The question still remains: who is sitting at that keyboard?" "Without a face or a person to link the words to, a user feels no qualms ridiculing another person's ideas or statements."

Students were asked whether they thought more writing using the computer would improve their writing skills.

**Table II**
**Traditional Undergraduate Students Perceptions About Writing Improvement In An On-line Course**

| | Will Improve | Won't Improve | Mixed | NA |
|---|---|---|---|---|
| Male (70) | 18 | 17 | 31 | 04 |
| Female (102) | 15 | 43 | 37 | 07 |
| Totals (172) | 33 (19%) | 60 (35%) | 68 (40%) | 11 (06%) |

The majority of students felt their writing might improve by using writing on the computer to communicate during the class, but they also identified some trade-offs or fears that might occur using this method.

Because comments and assignments would be generated on the computer, students generally somewhat agreed that writing skills would improve in on-line course, but the majority quickly qualified that statement with a variety of reasons including saying that communication involved more than just typing words on screens.

Representative student comments about writing improvement include: "I feel that the computer is a perfect medium...to improve the skills that students will be expected to have in their future profession. Students will have to form skills that would cause people to want to hear or read their ideas."

But students also had fears that echoed Scott & Rockwell's (1997) writing apprehension findings: "There are many opportunities to show writing skills besides on the computer;" "All the chatroom would show is who's the fastest typist;" "I don't think that someone would talk with poor grammar in class and suddenly be transformed by writing it down. It would still just demonstrate a person's ability to write."

The students who saw both positives and negatives to writing in chatrooms and for on-line assignments voiced similar concerns. "I feel the opportunities to demonstrate your writing and communication skills would be the same either way;" "To me the interpersonal communication is just as beneficial as the writing experience;" "I guess that since all correspondence in this new class will be done over the computer, it will give instructors more of an opportunity to critique our writing skills. I think that in the chatroom system everyone will be writing so fast that there will be many mistakes in spelling, grammar and punctuation;" "I agree that your typing skills and computer use will be enhanced, but I disagree that your writing skills will improve, because when you write on paper you can go back and check your work;" "It's true that since participating will be done by writing on a computer, writing skills will improve. On the flip side, speech skills will decline."

Students were asked whether 24-hour-a-day access via the computer to course materials, including lectures and the course instructor, would be an advantage or disadvantage.

**Table III**
**Traditional Undergraduate Students Perceptions About 24-Access to Course Materials & Instructor**

| | Advantage | Disadvantage | Mixed | NA |
|---|---|---|---|---|
| Male (70) | 40 | 12 | 15 | 03 |
| Female (102) | 29 | 34 | 35 | 04 |
| Totals (172) | 69 (40%) | 46 (27%) | 50 (29%) | 07 (04%) |

This was the most well-received part of the proposal to putting the course on-line, supporting Monaghan's 1996 study findings.

Student comments outlined the following advantages: "You cannot beat having lectures right in front of you at any time for your convenience;" "This would definitely allow students to do the classwork when it would be most convenient for them...;" "The 24-hour availability is great! Some students work better at night, while others work better in the morning or afternoon. Also, it would help those students who have jobs or play sports manage their time a little better;" "...I think more students would make more of an effort to do this than have to wake up at 8:30 to get the class lecture notes."

Students also found several different objections to 24-hour computer access, echoing the self-discipline concerns Guernsey (1998) found. "I feel, as college students, we would take advantage of this. If they can participate "any time" I believe this class would be pushed down to the bottom of priority lists...;" "Procrastination is already a popular trait among us students, and this would only add to it."

Other students agreed with findings about learning styles in On-Line's 1998 and Guernsey's 1998 studies and concerns voiced by the American Federation of Teachers: "I am a verbal person and I do better by listening to others than I do by reading by what they say. Not hearing the lectures would make it more difficult...to decipher what was important and what was just words;" "Being able to look over the lecture at any time of the day and probably more than once would be a big help if you understood what the instructor was talking about. In some ways it may be harder to read the lecture as opposed to listening because by listening I get a better idea of what is being said;" "The 24-hour availability is helpful, but what about students who still have questions after the given instructions?"

Still others were more directly representative of Scott & Rockwell's 1997 technophobia characteristics: "We already have 24-hour access to our course materials. At least I know that my notes, class handouts and textbook are available to me at any time, and I don't have to go anywhere to get them."

Cheating was another topic students were asked to comment on; specifically is the opportunity to cheat in an on-line course greater than in a traditional classroom-based course?

**Table IV**
**Traditional Undergraduate Students Perceptions That More Cheating Opportunities Will Occur In An On-Line Course**

| | A Concern | Not A Concern | Mixed |
|---|---|---|---|
| Male (70) | 03 | 46 | 21 |
| Female (102) | 01 | 73 | 28 |
| Totals: (172) | 04 (02%) | 119 (70%) | 49 (28%) |

Ken Dickinson (1997) and Drew Tiene (1997) speculated that students would have more opportunities to cheat during on-line courses; students in this study somewhat agreed with him but also maintained that people who cheat will pay for their deeds later. Clearly the majority of students were not concerned with an increase of cheating in an on-line course as compared to a traditional classroom-based course.

Most people said they believe cheating now will catch up with students later. "Those who want to learn, will, and those who don't will always find a way to get out of it;" "Everyone should be acting like honest adults by this point in their lives, and if they are not, we all need to be praying for them;" "I do not think an on-line course would make it easier to cheat than a traditional class. If someone wants to cheat, he or she will find a way to do it."

Students were asked whether they felt confident enough in their computer capabilities to take an entire course on-line.

**Table V**
**Traditional Undergraduate Students Perceptions About Enough Confidence To Take A On-line Course**

| | Yes | No | Mixed |
|---|---|---|---|
| Male (70) | 41 | 29 | 00 |
| Female (102) | 48 | 44 | 10 |
| Totals: (172) | 89 (52%) | 73 (42%) | 10 (06%) |

Answers to this question produced the most readily identifiable technophobic responses in this study. Slightly more than one-half of the students said they felt confident enough with their computer skills to take an entire course on-line; but even though they felt confident, many often added the "but..." factor: "I love technology, but I do not entirely trust it." "I am comfortable enough with computers to take an entire course on-line, but I do not own a computer." "I do own a computer, but it is not the most up-to-date model and it does not have a CD-ROM." "I do own a computer, but I do not have Internet access because I live in a sorority house."

Nearly as many said they definitely did not feel confident enough to do so. Students talked about anxieties about whether the systems would be operating properly, whether or not assignments "arrived" correctly through cyberspace. "I'm afraid that I wouldn't know how to work the program, or If did understand it but got stuck I wouldn't know where to turn for help." "Dealing with computers on a regular basis has taught me that any thing can happen."

Another facet of technophobia was identified using a scale where "1" indicated great computer proficiency and "10" indicated no computer proficiency at all. Students assessed their own computer skill level.

**Table VI**
**Traditional Undergraduate Students Self-Assessed Computer Proficiency**

| | 1-2 | 3-4 | 5-6 | 7-8 | 9-10 |
|---|---|---|---|---|---|
| Male (70) | 12 | 27 | 21 | 10 | 00 |
| Female (102) | 08 | 28 | 44 | 22 | 00 |
| Totals (172) | 20 (12%) | 55 (32%) | 65 (38%) | 32 (18%) | 00 |

Slightly less than one-half of the students indicated they felt they possessed a fairly high level of computer proficiency, while fewer than one-fifth felt they were lacking in computer skills. The findings of Scott & Rockwell's 1997 study on technophobia, were clearly evident in this self-assessed computer proficiency. "To be quite honest, I don't have a full understanding of what a chatroom is. I have never done this, so I guess I would be hurting in this area, also;" "There are a number of people who are unable to operate a computer and they should not be penalized because of this;" "I would not be the first in line to sign up for a class structured by computer technology and participation;" "I disagree with on-line classes for the simple reason that I don't even own a computer. My typing skills suffer because of this, which would put me at a disadvantage;" "I toy around with the computer, but I don't know enough to base an education on it."

But students also confronted their technophobia fears in this study. ""The idea is complicated and exciting. If handled properly, it could be a way for more people to complete their college educations;" "To have the opportunity to take Media & Society as an on-line computer course would be an exciting, new opportunity. I am not completely confident on a computer, but I feel I would be able to become more confident by taking this course on computer;" "Many people in this world have never used a computer...I feel like these people better get on the ball and learn how to use a computer. Computers are taking over the world whether we like it or not;" "Although I am not a computer whiz, I believe that an on-line class is an excellent idea, especially for a journalism and broadcasting class;" "If this class was in fact offered, it would definitely give me an incentive to go and learn how the program works."

## Issues and Implications

Findings from this study of undergraduate journalism/mass communication majors, the end-users of this technology, highlight some of the previous research findings about distance education and suggest some considerations specifically for distance education proponents both in design and philosophy.

Undergraduate students, even those in favor of participating in an on-line course, often mentioned not losing the social connections of a traditional classroom. Guernsey (1998), Norman & Towles (1994), and Blumenstyk (1996) found that direct personal contact was valuable not only for providing direction to students but for assessing instructors' own personal effectiveness in teaching. Guernsey also found that the quality of interaction present in on-line courses was questionable, and students in this study also questioned the quality through such answers as concerns about the role of body language and talking through type. To combat the change from total traditional personal classroom contact, students often suggested an integration of on-line technology where they saw distinct advantages, such as posting notes, lectures and assignments to the Web, and maintaining some number of traditional classroom meetings. Perhaps the message here for journalism/mass communications educators is that we teach within the framework of people-oriented professions, and that future practitioners in these professions need to develop social interaction skills to function as media professionals. Students responding in this study felt that this pedagogical goal should not be ignored or compromised.

Nor does the computer-delivered model promote what John Goodlad (1983) calls "developing productive and satisfying relations with others based on respect, trust, cooperation and caring." The only social behaviors mentioned in most on-line courses is chatroom or on-line discussion, which uses technology not only to link people, but to separate them from any contact other than what appears on the screen.

Student motivation ala Guernsey (1996) was another issue discussed by some of the students in this study. Major concerns included creating "lazy, procrastinating students" to future "robots" and "hermits." In traditional classroom situations, many students said they were at least motivated to get out of bed and come to class. Just pushing a button to log-on seemed to squelch that motivation, several students wrote.

The suggestion here is that on-line instruction, both in content and presentation, will have to include enough incentives for students to find a computer, log-on and complete work on deadline. For journalism/mass communications students this is particularly crucial since the nature of media work is based almost entirely on deadlines. Without a firm foundation in time management, students entering their first work experience with deadlines will die!

The students' own perceptions about their ability to successfully complete an on-line course were mixed. More males than females said they could do it, although more females said they owned computers. This suggests that gender may play a factor in attempting such a course; perhaps women do not perceive themselves being as technically adept as men, something Scott and Rockwell (1997) mentioned. However, a number of students said such a course would force them to become more familiar with computer technology and that would make them better communicators.

So a list of topics for future research could include:

- how much gender influences students' confidence level in attempting new technological methods of learning;
- instructors and administrators need to be aware of the types of communication courses that lend themselves to computer-based instruction, especially paying attention to those skills, such as journalistic interviewing and public relations persuasion, that require face-to-face or personal interaction;
- this study also suggests that attention be paid to student learning styles and instructor teaching methods. As discussed above, some students and instructors are more technically oriented and experienced, while others seem to feel more comfortable with more conventional classroom instruction.

Another factor is the learning curve for both students and instructors in not only operating new technology, but not experiencing anxiety using it.

- the tendency is to lump all students together as one homogenous mass. It is no surprise that non-traditional students prefer adjustable courses given their decreased ability to find time to sit in a traditional class at a specificed time. Undergraduates, however, seem to expect and welcome those experiences as part of the college experience. . Because there are significant differences between traditional undergraduate students and non-traditional and graduate students, further research should segment these groups to determine who wants to learn what in what format—in other words, matching learning preferences to course delivery methods

Because this was an exploratory effort, this study has acknowledged limitations. First, the sample was not random nor was any effort made to construct a random sample. The suitability of using these undergraduate students as subjects in this pilot study, however, is that they are the target audience for this particular course as it changes from a traditional classroom course to an on-line format. Therefore, their concerns and attitudes provide important suggestions of what of end-users might see. The responses, however, cannot be nor should be generalized to any other group.

As teachers in the media-related professions, one of our first goals is to teach students about the importance of acknowledging the varying preferences, attitudes and perceptions of our audiences. In the on-line literature little or nothing has been done to assess attitude levels of the primary audiences for this technology—students. Without consulting and planning with these audiences, the move to a new course delivery format may experience more difficulties than necessary, and may even fail.

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# THE TEASE EFFECT OF SLOW DOWNLOADING
## Arousal and Excitation Transfer in Online Communication

By

S. SHYAM SUNDAR
&
CARSON B. WAGNER

College of Communications
PENNSYLVANIA STATE UNIVERSITY
212, Carnegie Building
University Park, PA 16802-5101

Voice: (814) 865-2173
Fax: (814) 863-8044
E-Mail: sss12@psu.edu

**Paper presented to the Communication Technology and Policy Division at the annual convention of the Association for Education in Journalism and Mass Communication (AEJMC)
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The first author is an assistant professor and director of the Media Effects Research Laboratory and the second author is a graduate student at the Penn State College of Communications.

*When a website image takes a long time to load onto our computer screens, the wait may be frustrating. But it can also be arousing. Subjects exposed to a slow-loading image in a between-subjects experiment (N = 30) experienced a significantly higher rise in their skin conductance compared to subjects exposed to a fast-loading version of the same image. Subsequent to this manipulation, they also showed greater excitation-transfer effects and engaged in more web-browsing activity.*

As any internet user knows, some websites take longer than others to load onto our computer screens, especially if they contain graphics and other memory-heavy features. With the rapid development of new tools that make it easier for web developers to incorporate various multimedia features (such as audio downloads and real-time videos) in their sites, the issue of loading speed has attained critical importance in recent months. So much so that the hardware industry has bestowed top priority to developing technology that would enhance the speed of internet access for users (Bransten, 1998; Burgess, 1998; Chandrasekaran, 1998; Mills, 1998; Schiesel, 1998).

Historically, new communication technologies have made things better (which usually means 'faster'), but WWW seems to slow down the process of viewing. Thanks to the need for downloading time of websites, computer screens take longer than TV screens to show images. This concept of loading speed is alien to users of traditional media such as television. Viewers of broadcast and cable channels do not have to wait for channels to "load" on their TV screens whenever they surf the spectrum with their remote-control devices. That is why, it is reasoned, the waiting period while browsing the Web may lead to frustration amongst users.

However, there are strong theoretical reasons to believe that slow-loading may indeed have some beneficial effects on users. The delayed gratification involved in the image loading slowly may serve to increase physiological excitation that could lead to desirable transfer effects. Viewers may experience sympathetic excitation or arousal — much like the effect of a strip-tease routine — which may then lead to

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more pro-active browsing of other websites via hyperlinks.

An experiment was designed to test this possibility. Subjects were exposed to a website that loaded on the screen at either a fast pace or at a slow rate. The fast vs. slow loading speed constituted the independent variable in this study. Subjects' arousal (both during the loading and afterward) as well as their subsequent browsing behavior were the dependent variables. The research question may be summarized as follows: For Web users, controlling for content and prior arousal, what is the relationship between the rate of loading speed and the level of arousal as well as the level of browsing activity.

This paper will first delineate the rationale behind the application of previous research on arousal and excitation transfer to the present context and propose a set of hypotheses. It will then describe the methods and results of the experiment designed to test the hypotheses. Finally, it will discuss both the theoretical and practical implications of the study's findings.

### Loading Speed and Arousal

Attending to media is an inherently emotional experience. Numerous studies have documented the emotional effects of media by documenting changes in audiences' arousal levels as a function of both message elements and formal features (for overviews, see Zillmann, 1991a; Reeves & Nass, 1996).

The anticipation accompanying the experience of a slow-loading website may be likened to the emotion experienced while watching suspenseful drama. In his summary of research on suspense, Zillmann (1991b) states that viewers undergo "empathetic distress" during periods of acute suspense (as when a liked protagonist faces peril). This distress is accompanied by heightened sympathetic activity, i.e., physiological arousal. Since the experience of uncertainty and anxiety described in the suspense literature is similar to the frustration endured by a web user while waiting for a slow-loading image to download (if not in degree, at least in kind), it may be argued that a slow rate of loading is capable of generating higher arousal amongst users than a fast-loading site.

While the suspense literature would suggest that this arousal is due to frustration resulting from anticipation, it may also be argued that the arousal stems from increased cognitive activity on the part of the user during the waiting period. From stimuli seen and heard throughout one's life, the brain creates models (or categories) of information which are used to compare new information the brain receives. Every time new information enters the brain, a process is begun to match the newly received data or create a new model. Each time the brain registers a request for which it needs to create a new model, it alerts one's entire system to the need for more information about the stimulus. This causes one's level of arousal to increase (Goodman, 1985). During the process of a slow load, users may be more likely to mentally elaborate on the content of the website (and fill in missing information) than during a fast load. Recent research on motion effects supports such an explanation by showing that moving pictures are surprisingly less arousing than still versions of the same pictures (Detenber & Reeves, 1996). The authors theorize that still pictures are less cognitively demanding; hence they facilitate greater rumination and augmentation among viewers, leading to "a kind of internally generated arousal" (p. 79). Applied to the Web context, it may be reasoned that the thought processes triggered in the user while waiting for the slow-loading image may indeed generate greater arousal than if the user was instantly presented with a fast-loading version of the same image.

This heightened arousal may also result in changes in subsequent web-browsing behavior. If we conceptualize the emotion experienced during loading in terms of user expectations or gratifications sought, we may be able to predict browsing activity in terms of expectations. At the behavioral level, expectancy value models in media gratifications research lend insight into the consequences of expectations (e.g., Palmgreen & Rayburn, 1982; Babrow & Swanson, 1988). Depending on user expectations of loading speed, a slow-loading site may or may not generate sympathetic activity. Expectancies may also be used to predict the valence of user evaluations of web content as well the nature of their browsing activity.

Whether it is anticipation, elaboration or expectation, theory and research suggest that the saying, "it's better to aspire than to arrive," is also applicable to one's media experience. Specifically, it's more arousing to receive something with some forewarning and delay than to receive it instantaneously. That is to say, delayed gratification is much more arousing than instant gratification. This perhaps underlies the appeal of strip-tease, which has been described as "artfully exploit(ing) the tantalizing effects of strategic concealment" (Steele, 1996, p. 119), and also explains the reason why sexually suggestive models are considered much more sensuous than fully nude models. This is also the reason why we may not feel so good to get those

Christmas presents if there hadn't been a "night before."

Applying this rationale to the current investigation, we propose the following hypothesis:

> H1: *A slow-loading website will be more arousing than a fast-loading website.*

That is to say, if subjects viewed an image on a website that loaded slowly, they would experience significantly greater physiological arousal than their counterparts viewing the same image on a site that loaded faster.

### Loading Speed and Excitation Transfer

Whether the arousal experienced as a function of loading speed is valenced positively (delayed gratification) or negatively (frustration), the elevation of sympathetic activity in the autonomic nervous system is likely to be no different, given the nonspecificity of physiological arousal (Zillmann, 1991a). Autonomic arousal is an indicator of the intensity of emotion rather than the nature or kind of emotion felt by the respondent.

An important consequence of such arousal is its potential to affect subsequent activity. Since physiological arousal is relatively slower to decay, residues of excitation are likely to remain in the individual even after the stimulus has been removed from sight.

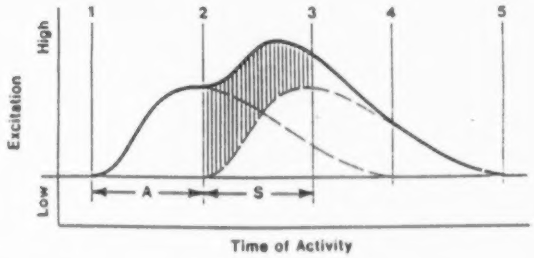


*Figure 1. A model of excitation transfer in which residual excitation from a preceding excitatory reaction combines additively with the excitatory reaction to current stimulation. An antecedent stimulus condition (A), persisting from Time 1 to Time 2, is assumed to produce excitatory activity that has entirely decayed only at Time 4. Similarly, a subsequent stimulus condition (S), persisting from Time 2 to Time 3, is assumed to produce excitatory activity that has entirely decayed only at Time 5. Residual excitation from Condition A and excitation specific to Condition S combine from Time 2 to Time 4. The extent to which transfer of residues from Condition A increases the excitatory activity associated with Condition S is shown in the shaded area (from Zillmann, 1979).*

Excitation Transfer theory posits that residual arousal from one stimulus will combine with arousal from a subsequent stimulus, thereby intensifying the affective reaction to the latter stimulus (Zillmann, 1971, 1978, 1983). For example, if one were to be aroused by watching erotica, the residual excitation from this experience will transfer over to the next program (say, violence) such that the arousal due to the violent program will be much stronger than the arousal from the same program without the benefit of residual arousal from the earlier erotic program. See Figure 1 for a visual depiction of excitation transfer.

The excitation transfer model has been successfully used by advertisers seeking to maximize audience reaction to an ad placed in the midst of a variety of other television stimuli (Reeves & Nass, 1996). The model has also received widespread support from academic research measuring transfer effects from one program to the next. For example, Oliver (1994) found that sexual portrayals enhanced arousal for subsequently occurring suspenseful scenes. Other studies have shown that enjoyment of such varied entertainment fare as music and humor have been intensified by the presence of residual excitation from prior arousing stimuli (Cantor & Zillmann, 1973; Cantor, Bryant & Zillmann, 1974).

The transfer theory as well as the vast body of research supporting its prediction lead us to our second hypothesis:

> H2: *Subjects exposed to a website subsequent to a slow-loading website will show greater arousal than subjects exposed to the site subsequent to a fast-loading website.*

That is to say, if after viewing the website manipulated to load either fast or slow, subjects are navigated to another website (which loads at the same rate for both conditions), their experience of this second site will be different depending on whether the loading speed of their initial site was fast or slow. Specifically, we expect that if subjects were navigated from a slow-loading site onto, let's say, a news site, they would be much more aroused by the news than if they were linked to it from a fast-loading site.

In addition to predicting increased arousal for subsequent stimuli, excitation transfer theory postulates behavioral consequences of transferred excitation. That is, excitation produced by a stimulus can potentially enhance one's emotional reaction to not just another stimulus occurring subsequently, but to *any* situation following the initially arousing stimulus. So, for example, if you're angry that your favorite team lost in a televised sports event, the arousal associated with that anger will transfer over to your subsequent interaction with your spouse or kids at home. As Zillmann (1991a) points out, residual arousal from anger may intensify fear; "residues from fear may intensify sexual behaviors; residual sexual arousal may intensify aggressive responses; and so forth" (p. 117). Research has shown that residual excitation from subjects aroused by physical exertion can intensify such widespread behaviors as anger, aggression, feelings of egotism, altruistic inclinations, and experiences of sexual excitement (Zillmann, 1991a).

All these behavioral effects are context-bound. In the context of the present study, the main behavior of interest is browsing activity. We were specifically interested in ascertaining whether residual excitation affects the volume of browsing activity. Taking the lead from theory and prior research on behavioral consequences of excitation transfer, we hypothesized the following:

> *H3: Subjects exposed to the Web subsequent to a slow-loading website will show greater browsing activity than subjects exposed to the Web subsequent to a fast-loading website.*

We hypothesized that the number of sites explored (by clicking on hyperlinks) by subjects in the slow-loading condition will be significantly higher than their counterparts in the fast-loading condition. By tabulating the number of sites visited by subjects in both conditions, we will be able to assess the effect of excitation transfer on user behavior in the WWW environment.

## Method

All subjects (N =30) in a between-subjects experiment were exposed to a website featuring an advertisement. For half the subjects, the ad downloaded on the screen slowly, in stages. For the other half, the ad downloaded instantaneously. Subjects' arousal during the entire exposure to the ad was measured via skin conductance.

Subsequent to the ad, all subjects were linked automatically to a news website, which loaded uniformly in both conditions. Physiological arousal was again measured during their viewing of the news site. In addition, an unobtrusive measure of their browsing activity was obtained by recording the number of hyperlinks selected/clicked by each subject.

### Subjects

Thirty male and female subjects were drawn from undergraduate communications classes. Fifteen subjects were randomly assigned to each of two conditions (fast and slow download). All subjects signed an informed consent form prior to their participation in the experiment.

### Stimulus Material

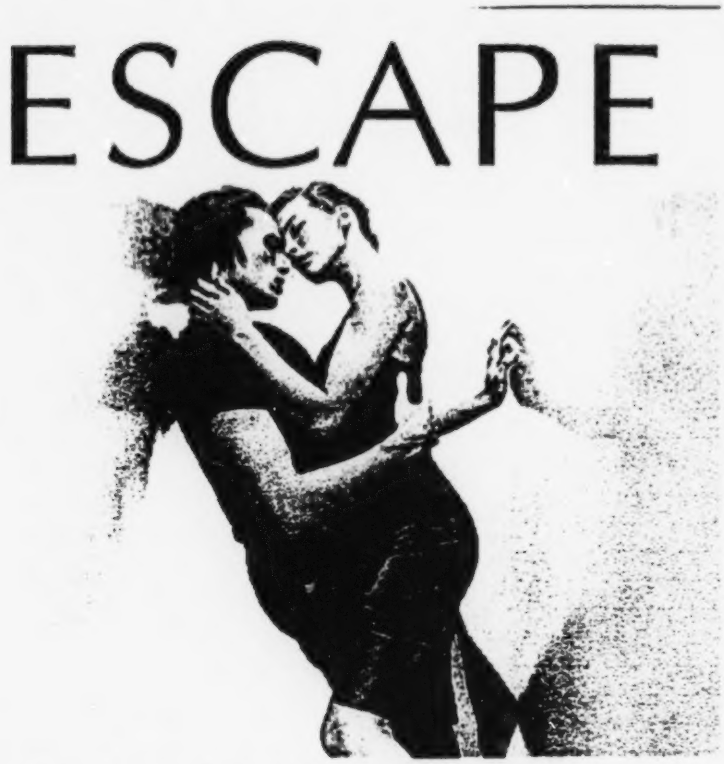
Each subject viewed a digitized version of an advertisement for Calvin Klein's "Escape" body fragrance. Since Escape is marketed as a unisexual fragrance, the ad used was clearly targeted toward both genders. It featured a black-and-white image of a male and a female model embracing, with the word "ESCAPE" positioned across the top margin. This particular ad was released during the spring/summer 1997 campaign season, and it was retrieved from a web-based archive of national ad campaigns. The lower portion of the ad was removed to omit the "Calvin Klein" brand name and product image.

### Experimental Treatment Conditions

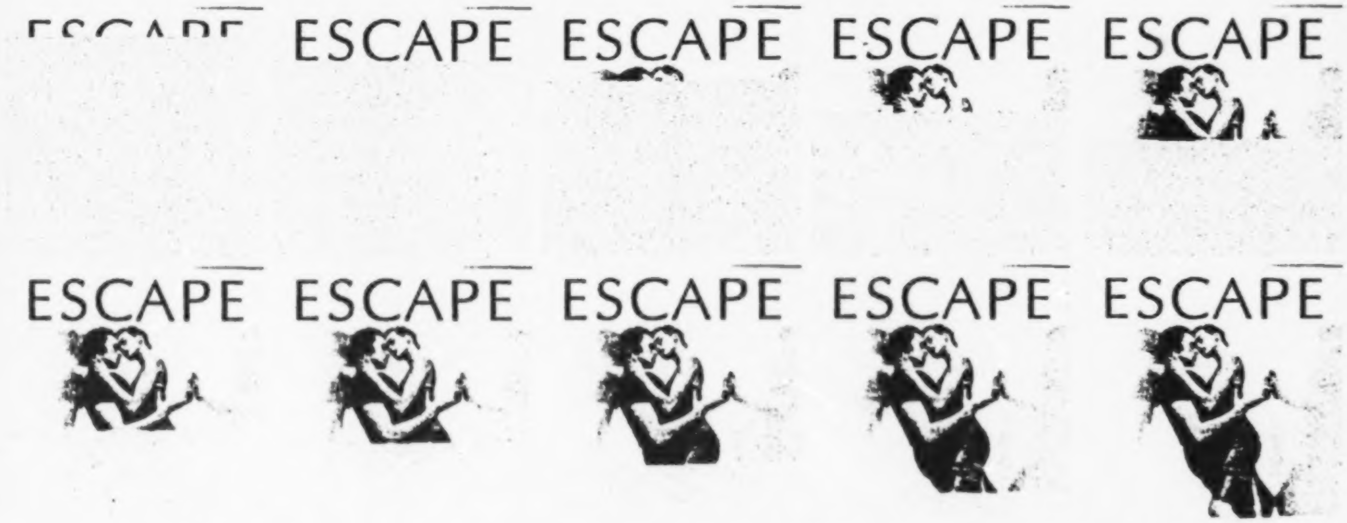
Subjects were randomly assigned to one of two conditions: fast download and slow download. The stimulus material and experimental procedures were identical for both conditions. However, in the fast download condition, the stimulus material (the image described above) appeared on the screen immediately following the start of the procedure, whereas the image slowly revealed itself over a period of 18 seconds in the slow download condition. In both conditions, however, subjects were exposed to the ad for a total of 20 seconds.

For the fast download condition, the stimulus material was composed of a single Graphic Image Format (GIF) version of the image as outlined above. A copy of the GIF file and the HTML page were stored in the web browser's cache to allow for immediate appearance of the image as the procedure began. Subjects viewed the image for a period of twenty seconds. They were then linked to CNN's home page via an HTML "refresh content" command embedded in the page.

For the slow download condition, the stimulus material was composed of an animated GIF which simulated a gradual download of the ad. An eighteen second animated GIF was created from 10 copies of the original image. In simulating a gradual download, the first of the ten copies shown only contained a small portion of the original image (the rest was made invisible to the browser), and each successive copy showed slightly more of the original image than the copy displayed before it. Each successive



Fully downloaded stimulus as viewed by all subjects


ESCAPE
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ESCAPE

Breakdown of frames used to create Animated GIF for slow download condition

*Figure 2. The stimulus ad which was manipulated to load either instantaneously (fast download condition) as shown on top or slowly (slow download condition) as shown at the bottom.*

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copy was displayed after a delay of one-half to two seconds, and the image replacement was undetectable. As in the fast download condition, after the entire image appeared on the screen, subjects were automatically linked to CNN's home page. See Figure 2 for a visual display of the various stages of the slow-loading ad as well as a copy of the fully-rendered ad.

### Dependent Measures

Two dependent measures were used in the experimental procedure: Physiological Arousal determined by measuring skin conductance, also known as Galvanic Skin Response (GSR), and a behavioral measure of subjects' web-browsing activity.

GSR measures were used to assess subjects' reactions to the downloading/viewing of the stimulus material and the downloading/browsing of CNN's home page and website. GSR is a psychophysiological measure which estimates the amount of sweat generated by the stimulus by calculating the level of electrical conductance through the skin, in micromhos or microsiemens. It is commonly used in communication research to estimate subjects' level of arousal (Goodman, 1985).

In this experiment, GSR measurements were recorded at the rate of two hundred samples per second. Three segments of 20-second GSR measurements were taken during the experimental procedure. The first was a baseline measure taken before subjects engaged in any web browsing activity, and it was used as a basis of comparison for the remaining GSR measurements. The second measure was taken during the loading/viewing of the stimulus material. The third measurement was started as subjects were linked to the CNN home page.

The behavioral measure tabulated the number of hyperlinks subjects selected after being linked to the CNN website. This tabulation was performed by the experimenter's assistant who was unaware of the experimental hypothesis and who viewed a remote screen which simultaneously displayed the subjects web browsing activity. When the CNN home page was fully downloaded, the assistant started a three-minute timer to control the amount of time during which subjects were measured. The assistant then tabulated the number of hyperlinks the subject selected before the timer expired. The experimenter then checked the assistant's list against the web browser's "history" window which catalogs recently visited sites. The history record was cleared before the next subject began.

### Procedure

The experiment was administered to subjects individually in a laboratory that was equipped with computers, a projection system configured to project the subject's computer screen onto a big screen in a different room, and associated psychophysiological hardware and software. As subjects arrived in the lab, they were greeted by the experimenter, told that the study in which they were about to participate concerned browsing the World Wide Web, and presented with an informed consent form which explained to them their rights as a research participant. After the subject reviewed and signed the document, the experimenter led them to an adjacent room which housed the web browsing computer and GSR measurement devices.

The experimenter then explained that before browsing the web, the subject was required to attach two electrodes (GSR measurement devices) to fingertips on their non-dominant hand – the hand not used for controlling the mouse. The experimenter then briefly demonstrated the procedure for attaching the electrodes, and the subject attached them as it was explained. After the subject was finished, the experimenter explained that he must check his computer to make sure that the electrodes were giving good readings. The experimenter then went into another room which housed the GSR recording computer and took the baseline measurement. Upon returning to the subject, the experimenter handed the subject an envelope containing instructions for the subject's web browsing activity. It was then explained to the subject that he or she may open the envelope, read the instructions, and begin at his or her leisure.

Next, the experimenter returned to the GSR recording computer and waited for the subject to begin. The starting web page for the experiment was displayed on the screen before the subject arrived, and it contained the words "Click Here to Begin." The word "here" was underlined as a hyperlink, and it was used to link the subject to the page with the stimulus material. The instructions handed to the subject were computer-printed on a single piece of paper, and read, "When you are ready, click "Here" on the screen. View the image. You will then be linked to a site where you may surf as you please. Please do not use the menus (File, Edit, etc.) at the top of the screen." The experimenter, who could watch the subject's browsing activity on a remote screen, began the second GSR measurement as the subject clicked the "here" hyperlink. After twenty seconds, the subject was automatically linked to the CNN home page, and the third GSR measurement was automatically started.

At this point, the experimenter's assistant, who was also viewing the subject's browsing activity on a remote screen, started a three-minute timer when the CNN home page had downloaded completely. The timer was used to control the amount of time during which the subject's browsing activity was monitored. The subject was allowed to browse freely while the timer ran, and the assistant tabulated the number of hyperlinks the subject selected before the timer expired.

Following the subject's browsing, the experimenter returned to the subject. The subject was thanked for his or her participation and given the results of their baseline and stimulus material GSR measurements. The subject was then asked to avoid mentioning specifics of the experiment to classmates or others due to the possibility of contaminating future subjects. In a follow-up manipulation check administered to subjects in their respective classes, it was found that none of the subjects involved in the experiment had determined download speed to be the independent variable. All subjects were debriefed and thanked for their participation.

### Data Analysis

Skin conductance (GSR) data were used to average each subject's arousal during each of three experimental segments: the first 20 seconds were used to compute mean baseline arousal; the following 20 seconds during the viewing of the Escape ad produced the mean stimulus arousal; the next 20 seconds during the viewing of the CNN site and related links was used for computing post-stimulus arousal.

In order to create the dependent measure for testing the first hypothesis, the percentage change in arousal from baseline was calculated by subtracting baseline arousal from stimulus arousal and dividing the result by baseline arousal (Sparks, 1991; Sparks & Greene, 1992; Oliver, 1994). Similarly, the transferred arousal measure for testing the second hypothesis was determined by subtracting baseline arousal from post-stimulus arousal and dividing the result by baseline arousal. The number of sites visited by each subject for three minutes since the commencement of the CNN page constituted the dependent measure for testing the third hypothesis.

A one-way repeated-measures multivariate analysis of variance (MANOVA) was first conducted, with loading speed as the independent variable and arousal, transferred arousal and number of sites visited as the three dependent variables. This was followed by a series of one-way analyses of variance (ANOVA) using loading speed as the common independent variable and the measures of arousal, transferred arousal and number of sites visited as separately entered dependent measures.

## Results

The MANOVA using all four algorithms (Wilks, Pillai, Hotelling and Roy) showed a significant effect for loading speed, $F$ (1, 28) = 32.15, $p < .0001$.

When the percentage change in arousal as a function of the stimulus was independently examined in an ANOVA with loading speed as the independent variable, there was a significant effect, $F$ (1, 28) = 11.29, $p < .01$. The rise in physiological arousal was significantly higher for subjects in the slow-loading condition ($M$ = .28, $SD$ = .16) compared to subjects in the fast-loading condition ($M$ = .08, $SD$ = .17). Therefore, H1 was clearly supported by the data.

When the excitation transfer measure (which was computed by subtracting baseline arousal from arousal during subjects' browsing of the CNN website, and dividing the result by baseline) was subjected to an ANOVA with loading speed as the independent variable, the result was again statistically significant, $F$ (1, 28) = 16.86, $p < .001$. The amount of arousal during subjects' browsing of the CNN site, expressed as a percentage of baseline, was significantly higher for subjects in the slow-loading condition ($M$ = .29, $SD$ = .15) than for their counterparts in the fast-loading condition ($M$ = .06, $SD$ = .14). Therefore, H2 was also supported by the data.

Finally, when the ratio measure of the number of sites visited by each subject was used as a dependent variable in a similar ANOVA, it was found that the number of hyperlinks selected by subjects in the slow-loading condition ($M$ = 5.35, $SD$ = 1.58) was significantly higher than the number of hyperlinks clicked on by their counterparts in the fast-loading condition ($M$ = 2.84, $SD$ = 1.05), $F$ (1, 28) = 26.01, $p < .0001$. Therefore, H3 also received support from the data.

In sum, results from the analyses suggest that loading speed is negatively associated with arousal. Specifically, it is found that subjects exposed to a website that loads slowly experience significantly higher physiological arousal than subjects exposed to the same website that loads instantaneously. Moreover, analyses show that this increased arousal transfers over to subjects' experience of subsequent websites. The transfer of excitation is shown by this experiment to be not only physiological but also behavioral: Individuals introduced to the Web environment via a slow-loading initial page are likely to engage in significantly more browsing activity than comparable individuals arriving via a fast-loading first page.

## Discussion

All three theoretical predictions regarding the relationship between loading speed and user responses were supported by data reported in this paper. As hypothesized, the physiological consequence of slow downloading was akin to that of a strip-tease. The tease effect demonstrated in this experiment is an indication of the ability of non-message features (such as loading speed) to induce physiological changes in audience members. Traditionally, psychological responses to media are studied in the media-effects paradigm as a function of message features such as genre or specific content elements such as violent acts (e.g., Bryant & Zillmann, 1991, 1994). This study contributes to a new and growing body of literature (e.g., Reeves & Nass, 1996) on the potential for technological features of new media to have psychosocial effects on receivers.

Moreover, the demonstration of carry-over arousal from the tease effect signals an interesting extension of the excitation transfer model. By exhibiting the explanatory power of the model to include not only content-related arousal but also technology-induced excitation, the study extends the usefulness of this media-effects formulation to the domain of new media.

The present investigation also demonstrates that excitation transfer is not merely physiological but noticeably behavioral. The transferred arousal seems to manifest itself in terms of increased browsing activity. Although we all complain about the slowness of download, once we endure it, we seem to be much more invested in the website than if we were brought into the site with an instantaneously loading image. The tease effect, therefore, constitutes a technological analogue of such social-psychological principles as "foot-in-the door" and "severity of initiation."

Another important theoretical contribution of this study is the introduction of the concept of "loading speed." Given present technological circumstances, loading speed is a variable that can take on many values from very slow to very fast. This enables effects researchers to study the psychological implications of loading speed from a variable-centered perspective (Nass & Mason, 1990). The variable-based approach has been used previously by researchers to pinpoint the precise features of media technologies that contribute to changes in cognitive spaces devoted to — and cognitive effort expended for — paying attention to stimuli, information processing and memory (Sundar, Narayan, Obregon & Uppal, 1997). Through our experiment, we have shown loading speed to be a variable capable of significantly altering audience experience of mediated content.

The tease effect and the subsequent transfer of excitation have practical implications as well. To begin with, they dispel the generally accepted notion that slow downloading is an undesirable attribute of the new Web medium. The arousal-inducing effect of slow-loading can be effectively harnessed by interface designers as well as website developers to improve audience involvement in their websites. The slow-loading feature of a website can be orchestrated either by purposefully including memory-heavy features on the initial page of the site or by artificially creating a tease effect with a series of interlinked GIFs, as done in this study. Audience excitement about a given website may be either due to anticipation or frustration, but the energy generated in the process can have desirable behavioral consequences for the website, as demonstrated in the present investigation. While attribution theory would predict that a website interested in immediate impression-formation may suffer from a slow-loading image on the initial page (with subjects directing their frustration toward a negative affect for content), educational sites as well as online advertisement campaigns may benefit from the tease effect of slow downloading. Any site that attempts to encourage browsing will stand to gain from the arousal generated by a slow-loading image. Also, given that arousal is positively related to memory (e.g., Bradley, Greenwald, Petry & Lang, 1992), sites that generate greater physiological excitation are likely to be more memorable.

Future studies may be designed to ascertain the trade-off between the impression-formation and excitation functions of loading speed. This would require measurement of both the arousal and the valence dimensions of emotion (Lang, 1995), and add tremendously to our understanding of not only the nature of the arousal but also the threshold levels of loading speed at which excitation and impression-formation affect each other. In order to accomplish this, loading speed will have to be conceptualized as a multi-category variable, with fine distinctions between categories. Clearly, loading speed is not a simple dichotomous variable. Speed is an inherently ratio-level entity, and is worth exploring at finer levels of measurement than the two-category level used in the present study.

Another area for future exploration could be devoted to variation in stimuli. The present experiment used a stimulus image of a couple in a posture that was somewhat erotic in nature (See Figure 2). It may be argued that the slow-loading condition might have rendered the image significantly more sexually suggestive than the fast-loading condition. Replications of the experiment with different images will serve to bolster or counter this argument and demonstrate the extent of generalizability of the tease effect observed in this study.

Another alternative explanation for the findings in this study may be rooted in the nature of the subject pool. Since all subjects in our experiment were college undergraduates raised on a staple of MTV and other fast-moving media fare, it may be claimed that they are less tolerant of slow-loading images than their adult counterparts, and may have become extremely agitated in the slow condition, thus registering high arousal levels. This is another external validity objection that can only be verified by conducting the experiment with non-student, adult subjects.

Future experiments with a variety of stimuli as well as subjects will not only determine the level of applicability of the tease effect but also serve to define its boundaries.

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# THE EFFECTS OF HYPERTEXT ON READERS' RECALL BASED ON GENDER

BY
Moon Jeong Lee

Ph.D. Student
at the College of Journalism and Communications
The University of Florida

Moon Jeong Lee
425 SW 2nd St. Apt. #2, Gainesville, FL 32601
Phone: (352) 375-3321 / E-Mail: moon@grove.ufl.edu

Communication Technology
& Policy Division

Abstract of the Paper Presented to AEJMC

## THE EFFECTS OF HYPERTEXT ON READERS' RECALL BASED ON GENDER

This study was interested in the effects of hypertext verses traditional text on readers' recall with added consideration for gender and gender constancy differences. The effect of different text formats was found significant in one article--traditional text had higher scores. The gender effect was significant in the other article. Males scored higher than females. Gender constancy was not significant.

# THE EFFECTS OF HYPERTEXT ON READERS' RECALL BASED ON GENDER

## INTRODUCTION

The new information technologies influence many aspects of contemporary society. One example of a new technology is electronic text. Electronic text users are no longer constrained to traditional formats that give readers a certain order to follow for the presentation of information. The newer technologies, such as hypertext[1] or hypermedia, give readers the ability to control the order in which information is presented. Furthermore, in this new hypertext environment, the reader must form his/her own cohesion and sequence of information. In traditional text, on the other hand, the writer presents the cohesion and sequence of information.

Scholars hypothesize that a reader takes an active role in finding information and encountering different types of information in a hypertext environment (Bourne, 1990; and Dee-Lucase & Larkin, 1995). Accordingly, each reader can create his/her own personalized educational system by manipulating the text in a way that he/she feels is most useful. In fact, it has been suggested that a person's active participation in the organization of educational material should increase the person's recall of information encountered.

However, there is considerable disagreement as to whether hypertext is beneficial for every individual (Gordon, 1990; Jonessen & Wang, 1990; Spiro & Jehng, 1990; Schroeder, 1994; and Dee-Lucase & Larkin, 1995). Critics argue that readers do not always choose what information to see next in an order that leads to effective learning (Jonassen & Wang, 1990, 1992, 1993; Spiro & Jehng, 1990).

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[1] "Hypertext" is defined as a computer text in which highlighted words or titles serve as links to other excerpts or documents of supporting information. For example, the reader may select a highlighted word for a further textual expounding on that selected subject. In contrast, "traditional text" is defined as a continuous text presentation such as a traditional book read one page after another.

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One concern for the use of hypertext and hypermedia learning is found in gender differences. Recent surveys of computer skills have revealed gender differences in attitudes toward and achievement in computer use.

Researchers argue that prior computer experience and other socialization processes are the major alternative explanations for gender differences in attitudes toward computers. According to Bussey and Bandura (1992), the most recent approach to understanding gender-typing emphasizes the central role played by self-socialization processes. Only a handful of empirical research focuses on gender differences of readers' ability to retrieve information in a hypertext learning environment.

Collecting empirical data to examine the advantages and disadvantages of hypertext with regard to gender is the first step in exploring a new computer-based learning environment. It will also help produce more effective information presentations based on the needs of individual readers.

The purpose of this study is to investigate how gender and text formats affect readers' recall. There are four main goals in this study:

1. To understand how human memory functions in information processing, especially recall.
2. To examine the functions and effects of different computer text formats on subjects' recall.
3. To investigate how gender and gender constancy play a role in information processing, especially with regard to the differences in hypertext verses traditional text presentation formats.
4. To address the implications of these findings.

## LITERATURE REVIEW

### 1. Memory and Information Processing

Many scholars have tried to find the best way to improve memory in information processes, but how the human brain incorporates memories remains unclear. However, it is well accepted that people selectively incorporate new information into their original cognitive frameworks. To understand memory performance (ability to comprehend and recall), Weinert (1988) suggests three factors that "must be taken into account: the cognitive strategies employed on a memory task, the knowledge an individual has about these strategies (metamemory), and the knowledge base to which new information is related" (p. 3).

Essentially, the brain receives new information in two ways. First, by organizing incoming information (building internal connections with new information) in (short-term) memory and second, by integrating this information with existing knowledge in (long-term) memory (Mayer, 1984).

### 1.1. Working Memory

A more developed concept of short-term memory is working memory, a system responsible for the temporary processing and storage of information in complex cognitive tasks (Baddeley, 1986).

Working memory plays a critical role in integrating information during comprehension. First, it grasps recent information and connects it to related information in long-term memory. Second, it maintains main information which is required to construct an overall

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understanding of the passage (Kintsch & Van Dijk, 1978; Baddely, 1986; Lee-Sammons & Whitney, 1991).

Different individuals have different capacities for working memory. It has been suggested that individual differences in working memory capacity predict a reader's ability to integrate concepts in a text. For example, Yuill, Oakhill, and Parkin's study (1989) shows that readers with low working memory span have poorer text integration abilities than readers with high working memory span. It has been suggested that low-span readers are less able to maintain necessary information in an active state (Baddeley, Logie, Nimmo-Smith, & Brereton, 1985; Lee-Sammons & Whitney, 1991).

### 1.2. Schema and Recall

According to Marcus, Cooper, and Sweller (1996), a schema is a cognitive construct that permits one to treat multiple elements of information as a single element categorized according to the manner in which it will be used (p. 49).

When a story is processed from a particular perspective, the perspective functions as an organizing schema that leads to a reader's goal and serves as a framework to integrate information (Baillet & Keenan, 1986). Several studies have shown better recall of schema-related information than schema-unrelated information (Goodman, 1980; Lee-Sammons & Whitney, 1991; Nakamura, 1994).

Furthermore, Lee- Sammons and Whitney (1991) examined the effect of working memory span and readers' perspectives on comprehension of a narrative text. According to their research, subjects with lower working memory spans relied more on their mental constructs (perspective). They concluded that the degree to which subjects used the goal to guide their comprehension varied with working memory span.

## 1.3. Working Memory Capacity and Text Format

There is growing evidence that individual differences in working memory capacity have profound influences on understanding of a text. Measures of working memory capacity have shown a high correlation with readers' scores on tests of reading ability (Baddeley, Logie, Nimmo-Smith, & Brereton, 1985).

Most theories of text comprehension agree that construction of referential representation in memory is necessary for text comprehension. According to Budd, Whitney, and Turley (1995), to establish relations between close clauses or sentences, readers must maintain incoming information in working memory. Thus, working memory facilitates the comprehension of information by establishing coherence at a local and general level. So if texts are coherent at a more general level, readers will require less working memory capacity to incorporate new information.

Individual differences in working memory capacity seem related to differences in the kinds of information (i.e. text format) or how much information is retained when reading texts (Kieras, 1981).

Budd, Whitney, and Turley (1995) investigated whether individuals' different capacities in working memory span is related to working memory management strategies while reading a text. The simpler the text, the less difference in comprehension between high and low working memory span subjects. These data imply that certain text formats can help readers recall more detailed information from a text.

Different text formats seem to affect readers' recall in addition to the efficiency of a working memory management strategy. Hence, further research is needed to determine how individuals with different working memory management strategies, cognitive tasks, and text formats affect readers' recall and comprehension processes.

## 2. Hypertext and Cognition

One of the challenges for designers and writers of text is how best to represent information for cognitive performance such as retrieval (Schroeder, 1994). Research on text structure, schema development, learner control, and text enhancement techniques provide a corner stone for designing informative materials to improve learning (Schroeder, 1994).

Plude (1992) points out that selective attention can be conceived of as executive control in the memory system. In other words, selective attention determines which information is processed or ignored. Selection is one of the necessary conditions for memory retrieval in information processing.

Most studies have been done with traditional text, such as books, but more recent studies address the acquisition of knowledge in terms of hypertext. Many scholars suggest that hypertext provides a high degree of interactivity. Interactive learning is widely assumed to be effective because active learning produces more effective learning outcomes.

Traditional text presents a continuous linear flow of information. When readers read a text, they are required to build a mental representation of the content in their own minds. With traditional text, readers read from top to bottom so that text processing is continuous. However, hypertext seems to interrupt continuous text processing where readers move back and forth between the text units. According to Dee-Lucas and Larkin (1995), this discontinuity in text could have two effects on the cognitive processing of information. "1) Interruptions in text study could interfere with the development of an integrated representation of the text as a whole (p. 435)." Each time when readers select a new piece of information, they have to build a connection and incorporate with prior information. It would be difficult for readers to identify the main idea of an overall text. "2) Interrupted text study may increase the depth of processing of content within each unit by focusing attention on the individual unit (p. 435)."

According to Bourne (1990), as a learner constructs a path to read the material, he/she must make choices and become a more active learner. This active role of acquiring knowledge allows the learner to reconfigure his/her own informative materials.

To remember factual information successfully, retrieval must be in response to some sort of cue (Farr, 1987). Dee- Lucas and Larkin (1995) suggested that unit titles would be better recalled than corresponding headings and subheadings from traditional text. The way in which the text is partitioned into units is highly salient to the reader because this information guides him/her to the next choice (Dee-Lucas & Larkin, 1995).

On the other hand, Jonessen and Wang (1990) argued that hypertext may actually hinder factual recall. Many scholars have suggested that hypertext systems can cause disorientation in the learner, overload cognitive processing capabilities, and encourage over-simplification, over-generalizations, and over-compartmentalization (Spiro & Jehng, 1990). Phillips and his colleagues (1992) examined different types of navigational devices in a hypertext database and found that those provided with the most minimal navigational tools achieved the highest recall.

Researchers have shown that prior knowledge and existing schemata influence learning, reading and inferencing. For example, Schroeder (1994) suggested that users may have difficulty tracking the overall structure of information in a hypertext and relating it to their prior knowledge. This problem may be worse for students with low prior

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knowledge by causing disorientation or cognitive overload. In his study, those with high prior knowledge did better on most variables and showed a greater increase in structural knowledge than those with low prior knowledge. One interesting finding is that treatments that provide more structural knowledge support appear to be less influenced by the degree of prior knowledge (Schroeder, 1994). This study suggests that further research is required to clarify how to help readers with low prior knowledge to get familiar with using hypertext.

Schroeder addressed problems in learning from hypertext (1994, p27).

1) In general, subjects expressed some confusion in going through the treatments. Hypertext style of learning was new to most of the subjects.
2) Hypertext can cause an additional cognitive burden by requiring users to remember the links and comprehend information as a whole. (Heller, 1990).
3) The number of decisions that needed to be made while processing information could be distracting to the user (Schroeder, 1994).
4) Hypertext requires skills in navigating, integrating new information with existing knowledge, gaining a comprehensive picture of the subject, self-management, and searching (Bourne, 1990; Jonassen, 1989; Kinzie & Berdel, 1990; Wright, 1990; Marchionini, 1988).
5) Hypertext is not appropriate for highly structured learning tasks (Duchastel, 1990; Spiro & Jehng 1990).

Hypertext readers must integrate specific content to the text as a whole. Dee-Lucas and Larkin (1995) argued that readers may process the text units as segment information rather than as interrelated information. Thus, readers with hypertext might have difficulty identifying the main points from the text as a whole, compared with readers using traditional text.

Other individual cognitive differences, such as experience with hypertext, risk-taking behavior based on gender, and motivational

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factors should be tested with hypertext vs. traditional text as predictors of performance in further or future studies.

### 3. Gender Differences in Attitudes toward Computers

Recent surveys of computer skills have revealed gender differences in attitudes toward and achievement in computers and computer use. Generally, researchers have found that females like computers less than men. One hypothesis relating gender differences is focused on attitudes toward computer use. For example, according to Newman, Cooper, and Ruble (1995), cognitive changes such as gender constancy, direct gender role development by encouraging the tendency for a consistent gender identity. Gender constancy is defined as "understanding that one's gender is permanent" in their study (P328). Once children consider themselves as boys or girls, they start to acquire gender schemata (Martin & Halverson, 1981). Gender schemata are "knowledge structures that categorize objects, behaviors, traits, roles, and attitudes as 'male' or 'female'" (Newman, Cooper, & Ruble, P328). According to this theory, as children get older, these schemata become more elaborate. These gender schemata affect the recall and comprehension of gender-related information (Newman, Cooper, & Ruble, 1995).

Based on this theme, Newman, Cooper and Ruble (1995) predicted that attitudes toward computer use (a stereotypically male activity) would be less positive for 5 to 9 year-old gender-constant girls. The results were consistent with their hypothesis. For example, gender-constant girls with high levels of gender knowledge liked working with computers less than any other subgroups.

Investigators suggest that less opportunity to interact with computers may be one reason why girls show lower levels of achievement than boys. Fetler (1985) suggests that lesser amounts of experience might account for the generally lower levels of achievement attained by girls.

The development of negative attitudes toward computers among girls can lead to less experience with computers, and this serves to maintain their negative attitudes. One example is that most children start to have computer experience by learning a computer game, but most computer programs and video games have generally been "male-oriented." Therefore, girls may become less interested in computer programs or video games. Wilder, Mackie and Cooper (1985)'s one of surveys demonstrated that males and females consider computers and video games more as male activities.

Research has shown that boys are more likely to enroll in computer camps than girls. Also, boys tend to spend more time using computers when computers are introduced into the classroom. For example, a California Department of Education (1982) study found that sixth-grade boys were more likely to use a computer at home and at school than girls (Fetler, 1985). Fetler(1985)'s study shows that boys outperformed girls in every major area of computer literacy and computer science achievement.

Despite these findings, some recent research involving college students finds less evidence of gender differences in attitudes toward computer use (Chrisler, White, & Morrissey, 1990; Pope-Davis & Twing, 1991). For instance, in Arch and Cummins's study (1989), 420 college students were surveyed about their computer attitudes after subjects were exposed to computers in either a 'structured' or 'unstructured' condition.[2] For females, prior computer use most strongly influenced the three subsequent dependent measures (computer use, attitude toward computers and perceived efficacy) while for males prior attitude was the most influential determinant. Generally, the higher rate of male computer use was decreased in the structured condition and increased in the unstructured condition (Arch & Cummins, 1989). In situations where computer access was structured into classroom activities, the differences between the sexes were weaken or disappeared (Arch & Cummins, 1989). Under this condition, both sexes were equally able to learn computer skills and to be confident in their abilities to use computers.

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[2] "In the 'structured' condition, students received training in computer use during class time and were required to complete all papers using the computer. On the other hand, students in the 'unstructured' condition were not given classroom-based training, but did have access to the machines outside of class and to training sessions, as well as assistance from experienced students or computer center staff (1989, p. 245)." 362 subjects out of 420, completed questionnaires; 178 in the structured classes and 184 in the unstructured.

Boys liked the computer more than girls at all ages. Some scholars assume that these tendencies occur because girls have less preference for mathematics and science and believe that computers require a knowledge of math or science for appropriate usage.

There also appeared to be gender differences in terms of computer classes. Females tended to take more introductory courses, while males were more likely to take a programming language course (Wilder, Mackie, & Cooper, 1985). No significant gender difference in previous experience with computers was shown in this study.

Females feel far less confident in dealing with computers than did males, even though their experience was not much different (Wilder, Mackie, & Cooper, 1985). For example, females with more experience with the computer actually reported themselves to be less comfortable and no more skilled than inexperienced males.

In college, highly motivated females do not consider computers as predominantly male-oriented. However, there are still differences between the sexes in terms of self-reported comfort, skill and overall experience with the computer (Wilder, Mackie & Cooper, 1985). Temple and Lips (1989) reported that female subjects felt inhibited from pursuing formal study of computers because of uncertainty about their own abilities.

According to Bamossy and Jansen (1994)'s study, although both genders had at least one experience working on the computer, boys were much higher in self-reported number of hours on the keyboard. On the spatial abilities test, boys scored 10% higher than girls. In terms of attitude, girls had significantly higher scores on the fear (Carey, Dusek, & Spector, 1988) and negative affect constructs relative to boys. At the same time, boys got much higher scores on measures of self-efficacy, positive affect, and beliefs regarding the use of computers.

These different approaches to learning how to operate and interact with computers may be subject to differential responses based on gender. Many studies have revealed different abilities in terms of gender. For example, according to APU's survey, the Assessment of Performance Unit, girls tend to do better than boys on reading and writing tasks (Swann, 1992). Born et al. (1987) and Stumpf and Jackson (1994) found evidence for a male superiority on reasoning and a female superiority on perceptual speed and memory. The studies reported here offer a good foundation to support the general findings in the literature regarding gender socialization with respect to high-technology products like computers. Based on past studies of gender differences regarding computers, it is logical to examine differential responses by gender to new types of operating systems, such as hypertext.

Memory retrieval is not only the cognitive process through which information is processed from storage and becomes active. It can potentially influence individuals' attitudes or behavior (Herrmann & Searleman, 1992).

Much research has ignored many social factors, such as prior attitudes and behavioral patterns (Wyer & Srull, 1986). Without integrating research from social realms, understanding human cognitive processes will be continually limited.

Based on this literature review, the following hypotheses were examined in this study.

H1 - Those reading from hypertext documents will have higher recall scores than those reading identical information from traditional linear-text documents.

This hypothesis is based on Schroeder's suggestion that hypertext can help a reader organize the new information and tie that information to prior knowledge. In this way, it is logical to test whether hypertext improves information processing by measuring how much information is recalled by the subjects who read a hypertext document in comparison with the subjects who read a traditional text document.

H2 - When reading a traditional text, female subjects will have higher recall scores than male subjects.

This hypothesis is based on gender-related research that revealed females' superior memory. For example, Stumpf and Jackson (1994) found that females scored higher than males on the memory factor.

H3 - When reading hypertext, male subjects will have higher recall scores than female subjects.

Because a computer is perceived as male-oriented, it is tentatively assumed that males will have higher recall than females when reading a hypertext document.

H4 - Male subjects with gender constancy will have higher recall scores, when reading from hypertext, than males without gender constancy.

H5 - Female subjects with gender constancy will have higher recall scores when reading from traditional text than those with gender non-constancy.

H4 and H5 are based on self-socialization process literature. According to the gender schema theory, gender schemata not only affects gender-related attitudes and beliefs, but also affects information processing. Many scholars believe that females' low achievement in computer classes may be because females tend to categorize computers as male objects.

## EXPERIMENTAL METHODOLOGY

The design for the research is a post-test only control group repeated measures experiment. The manipulation involved reading two different texts-hypertext and traditional text-each followed by tests for recall. After subjects finished the factual recall tests, subjects were asked to take the Bem test (BSRI) and answer demographic questions.

In the experiment, subjects were randomly assigned to two groups who read the same information from two articles on a computer screen. The order of text format varied with traditional text presented first in one group (condition 1) and hypertext presented first in the other group (condition 2). Thus, the design was a within subjects repeated measures with two articles, one in hypertext and the other in traditional text.

Gender constancy was measured by the Bem Sex Role Inventory (BSRI) (Bem, 1974), classifying subjects into four different categories; gender constant males, gender inconstant males, gender constant females, and gender inconstant females.

### 1. Developing the Stimulus Material and Measuring the Dependent Variable

Two topics were selected for the study after seven topics were tested for gender neutrality and interest among both males and females.[3] Next, these four articles were examined for level of interest in the topics. The two most interesting articles for both males and females were selected. One article (Topic 7) was titled "How much do you know about our Latin American neighbors?" and the other (Topic 4) was "The battle against segregation in America."[4]

The development of the recall test for this article involved the following procedure. For the article "How much do you know about our Latin American neighbors?," twenty-four multiple-choice questions were written to test readers' factual recall. Four questions were written for each of the initial six countries: Mexico, Guatemala, El Salvador, Nicaragua, Honduras, and Cuba. Sixteen graduate students at the University of Florida participated in the pretest. As the result of an analysis, items with Item Discrimination scores greater than .50 were kept for the test. Thirteen questions were adopted and 11 questions were dropped based upon the earlier study and the ability of the item to discriminate subjects.[5]

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[3] Thirty subjects were asked to indicate whether they thought the topics were "masculine" or "feminine" on a scale of one-to-five. Thirty one percent of the subjects ($N = 9$) were male while 69% of subjects ($N = 20$) were female. When the question "Do you think this topic is more likely to be of interest to a male or a female? Or do you think there would be no difference? (Circle one)," was asked, 4 topics were answered 'no difference' on Topic 2 and 4, 5, and 7. Thus, topic 2 (David W. Griffith's achievement), topic 4 (the battle against segregation in America), topic 5 (the theory of Plate Tectonics), and topic 7 (How much do you know about our Latin American neighbors?) were found to be gender neutral.

[4] Topic 4: "The battle against segregation in America" from How to prepare for the GRE, P521
Topic 7: "How much do you know about our Latin American neighbors?" from The World Almanac and Book of Facts 1995, edited by Robert Famighetti, USA

For the article "The battle against segregation in America," twenty-two multiple-choice questions were written for a simple factual recall test with approximately six questions for each paragraph. Sixteen graduate students at the University of Florida, participated in the pretest.

T-tests for males vs. females and item difficulty scores were computed. Sixteen multiple-choice questions were adopted and 6 questions were dropped from the recall test.

## 2. Study Design

Subjects were randomly assigned to either the hypertext first or traditional-text first order. The researcher explained the test procedures at the beginning of the study and subjects were told to read the text completely and not to go back to the readings after they started to do the recall test. Computers were preloaded with a letter from the instructor explaining the study and a choice, which led subjects to one of two different conditions. Data were collected on scan-bubble sheets. The study was conducted in a computer lab at the University of Florida.

Condition 1 began with "How much do you know about our Latin American neighbors?" (Latin America Article) in a traditional text version, followed by "The battle against segregation in America" (The Segregation Article) in a hypertext version. Condition 2 began with the Latin America Article in a hypertext version, followed by the Segregation Article in a traditional text version. Thus, each subject read both articles; one in hypertext and the other in traditional text with the Latin America Article always first and the Segregation Article second.

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[5] Through this process, the paragraph on Honduras was ruled out because only one question about Honduras was at the Discrimination level of $\geq .50$. To assure an equal number of questions for both readings, two more questions were added to the Latin America recall test, so that each of the five countries had 3 questions associated with it. In addition, a final 16th question was added, so that both tests had a total of 16 questions.

In condition 1, the Latin America Article was presented first in traditional text format with a geographic map. The subjects read a five-paragraph essay in traditional text format, from top to bottom. After the subjects finished reading, they clicked on the phrase "Click here when finished." This automatically led the subjects to the recall test.

When the subjects finished the first recall test, they clicked on the phrase "Click here when you are done." This led the subjects to the Segregation Article in hypertext format. The subjects were asked to click on one of the four words[6] (links) that led them to a single paragraph of the essay. The paragraph addressed information related to the word or link chosen. After the subjects completed the four paragraphs, they took the recall test. The order in which words (or links) were presented on the menu was manipulated to be randomly changed each time the subjects chose a paragraph to read. For example, if the order of links was [Cases][Federalism][Brown Cases] and the student selected [Brown Cases] to read, the next time the links appeared in a different order, such as [Cases][NAACP][Federalism]. Thus, the subjects could control the route of reading and create their own direction (for example, with four links, there were 24 possible orders). After the subjects completed all the readings, the computer sent them to another recall test.

In condition 2, the Latin America Article was presented first in a hypertext version. A map showed the five countries in Latin America and the subjects then selected a country about which to read by clicking on a red dot on the map. Each click took the subjects to a single paragraph about the country chosen.[7] The menu with the other countries was displayed at the bottom of the paragraph, so the subjects could select the next country about which to read.[8] After the subjects completed all of the readings, the computer sent them to the same test as in condition 1. Next, the Segregation Article in traditional text was presented in a linear order, from top to bottom. After subjects finished reading the text, they were asked to take the same recall test as in condition 1.

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[6] [Federalism][Cases][NAACP][Brown Cases]

[7] The computer version of the instrument for the study is located at http://grove.ufl.edu/~moon/letconl.htm

After subjects finished the recall tests, all the subjects were given the gender constancy test (Bem scale, 1976). Fourteen questions were given to subjects regarding demographic information, computer usage and familiarity, affinity for history, attitude toward computers and the degree of interest in and experience with hypertext. Each subject took from 35 to 50 minutes for the whole process.

One hundred sixty-three undergraduates at the University of Florida, were tested. Twenty-one sessions were held and subjects from different classes in the College of Journalism and Communications were recruited. Subjects were compensated with extra credit with their professor's consent.

## ANALYSIS AND FINDINGS

The purpose of the analysis was to find out whether presentation of the same information in different text formats affected subjects' recall scores and if these scores varied by gender and gender constancy. In addition, data were collected to describe subjects' race, age, computer ownership and use, Internet access, World Wide Web sites viewing time, and familiarity with hypertext. ANOVA and a independent-samples T-test were used to test for the effect of the different text formats, gender, and gender constancy at the .10 level as the criterion.

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[8] For example, if a student selected [Nicaragua], the links would appear in the following manner: [ElSalvador][Guatemala][Cuba][Mexico][The Map]. The order in which the country links were presented on the menu was manipulated to be randomly changed each time the subjects chose one. In this way, the subjects controlled the route of reading and created their own direction (for example, with five links, there were 120 possible different orders).

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## 1. Recall Score

Of the 32 questions, testing recall for both articles, the minimum number correct was 7 and the maximum correct was 29 with a mean of 18.9 and a standard deviation of 4.7.

An index for recall was created by using factor score coefficients. This summed index represented the total number of questions answered correctly for each article.[9]

For the 16 questions testing recall for the Latin America Article, the minimum correct was 1 and the maximum correct was 15 with a mean of 9.1 and a standard deviation of 2.9. A principal axis factor analysis, with oblique rotation, of these items was conducted. The scree-plot and eigenvalue suggested a one-factor solution that explained 15% of the variance. Thus, the factor score coefficient model was used to create an overall standardized index for correct recall. Use of the factor scores was appropriate to correct for difficulty of items.

Of the 16 questions testing recall for the Segregation Article, the minimum correct was 3 and the maximum correct was 16 with a mean of 9.8 and a standard deviation of 2.9. A principal axis factor analysis, with oblique rotation, of these items was conducted.[10]

## 2. Computer Knowledge and Familiarity

Fifty-eight percent of the subjects owned a computer and 98% (N = 151) said they were able to use computers either at home or at work/school or both while 2% (N = 3) responded "I don't use computers at all." Also, 90% of subjects have access to the Internet. The average time looking at Websites was just less than 2 hours a week (Mean = 128 minutes); 49% (N = 75) less than 30 minutes, 18% (N = 28) one hour, 20% (N = 30) between 2 and 4 hours, 5% (N = 7) between 5 and 7 hours, 6% (N = 9) between 8 and 10 hours, 1% (N = 2) between 11 to 13, and 2% (N = 3) over 14 hours.

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[9] A reliability analysis for the 32 multiple choice questions found that the standardized Crombach's alpha was .73.

[10] The scree plot and eigenvalue suggested a one-factor solution that explained 18% of the variance. Thus, the factor score coefficient model was used to create an overall standardized index of correct recall. Use of the factor scores was to control for the difference in difficulty level among items.

In terms of familiarity with the term "hypertext," 12% (N = 18) of the subjects said they were 'very familiar' while 37% (N = 56) answered ' very unfamiliar.' Some 17% (N = 26) were 'somewhat familiar,' 15% (N = 23) were 'familiar,' and 19% of subjects answered 'somewhat unfamiliar' (N = 29).

When the question "What is your highest level of hypertext knowledge?" was asked, 32% said "I don't know of hypertext at all," 31% said "I have heard the term hypertext, but I don't know how to use it," 16% said "I know how to use hypertext, but I cannot create hypertext documents," 16% said "I can create basic hypertext documents," and about 5% said "I can create advanced hypertext documents" (Table 1).

Table 1 Level of Hypertext Use

| " What is your highest level of hypertext knowledge?" | | % of answering 'Yes' |
|---|---|---|
| I can create advanced hypertext documents. | | 5.2% |
| I can create basic hypertext documents. | | 16.3% |
| I know how to use hypertext, but I cannot create hypertext documents. | | 15.7% |
| I have heard the term hypertext, but I don't know how to use it. | | 30.7% |
| I don't know of hypertext at all. | | 32.0% |
| | Total: | 163 |

The subjects also were asked to rate the ease of reading from a computer screen. 'Very comfortable' was the response of 32% (N = 49), 'somewhat comfortable' was indicated by 32.5% (N = 50), 'comfortable' by 26 % (N = 40), 'uncomfortable' by 7% (N = 11), and 'very uncomfortable' was answered by 3% (N = 4). In sum, 90.3% (N = 139) of the subjects were fairly comfortable with reading text from a computer screen while 9.7% (N = 15) answered 'uncomfortable' or 'very uncomfortable.'

### 3. Hypertext easiness and familiarity

To create an index of computer and hypertext use measures, a principal axis, varimax rotation, factor analysis of subjects' level of hypertext knowledge, familiarity with the term "hypertext," ease of using hypertext, access to the Internet, time spent viewing Websites, ease of reading hypertext document, comfort with a computer screen, computer use, and ownership, 9 items, was conducted.[11] Knowledge level and familiarity with hypertext, ease of using hypertext, and comfort with a computer screen, loaded on factor 1. Computer use and ownership loaded on factor 2. The standardized item alpha of the four Hypertext variables loading on factor 1, was .74. Thus, a Hypertext easiness and familiarity index was created from a summed-index of factor scores.

### 4. Computer use and ownership

For the Computer Use and Ownership index, the Crombach's alpha was .62. This two-item index indicates the ownership or availability of a computer at any one of three primary locations (home, school, or work).

### 5. Gender Constancy

Since the Bem scale was constructed in 1971, many critics have suggested that the Bem scale has become outdated. In this study, rather than using the original scoring for the Bem scale, a factor analysis was done to determine the items that consistently represented femininity and masculinity.

A principal axis, with varimax rotation, factor analysis of the 60 items from the BSRI was conducted for subjects' gender tendency. The scree plot and eigenvalues indicated a 3-factor solution with eigenvalues greater then 1.0.

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[11] The Eigenvalue and the Scree Plot indicated a two-factor solution. Factor 1 explained 28.4% of the variance and factor 2 explained 17% of the variance.

Factor 1 explained 20% of the variance and factor 2 explained 9% of variance. The 20 items loading on factor 1, in order of the magnitude of the factor loadings, were: compassionate, sincere, sympathetic, tender, understanding, warm, sensitive, affectionate, eager to soothe hurt feelings, gentle, friendly, helpful, feminine, tactful, loyal, likable, loves children, yielding, truthful, and self-sufficient. The items with loadings greater than .30 were submitted to a reliability analysis. 'Yielding,' 'truthful,' and 'self-sufficient' from factor 1 were dropped due to low reliability scores. The 17 items were used to create a new index. For the purposes of this study, these were labeled the feminine scale.[12]

For factor 2, 19 items had loadings greater than .30. They were: dominant, willing to take stand, assertive, aggressive, act as a leader, has leadership abilities, competitive, athletic, forceful, strong personality, flatterable, not shy, masculine, willing to take risks, makes decisions easily, ambitious, defends own beliefs, theatrical, and individualistic. These items were submitted to a reliability analysis. 'Individualistic' and 'theatrical' from factor 2 were dropped due to low reliability scores. The 17 items were used to create a new index and labeled the masculine scale.[13]

Factor 3 was not used because these items were "neither masculine or feminine in the BRSI.

Next, to create variables which represented gender constancy, the feminine and masculine indices were recoded into three equal groups representing high, moderate, and low scores.[14]

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[12] For the reliability analysis of the 17 remaining feminine items, the standardized item alpha was .90.

[13] For the reliability analysis of the 17 remaining masculine items, the standardized item alpha was .87.

[14] For the feminine indices, the scores $\leq -.035$ were categorized as low, the scores between -.034 and .57 were moderate, and the scores $\geq .571$ were high. Then, females with "low feminine" scores were categorized as gender inconstant while females with "high feminine" scores were classified as gender constant. For the masculine indices, the scores $\leq -.13$ were categorized as low, the scores between -.129 and .5 were categorized as moderate, and the scores $\geq .501$ were high. Next, males with "low masculine" scores were categorized as gender inconstant while males with "high masculine" scores were classified as gender constant.

The male subjects who had high masculine scores and low feminine scores were 50% of the male subjects who were categorized as the high masculinity. One the other hand, 15% of males in the high masculinity group had high masculine score and high feminine score. The female subjects who had high feminine scores and low masculine scores were 34% of the female subjects who were categorized as the high femininity. One the other hand, 40% of the females in the high femininity group had high feminine score and high masculine score.

### 6. Demographic Information

Of the 163 participants, 77% (N = 117) of subjects were white, 5.3% (N = 8) were Asian or Pacific Islander, 7.2% (N = 11) were African American, 9.2% (N = 14) were Hispanic American, and 1.3% (N = 2) were Native American. Thus, minorities comprised 23% (N = 35) and non-minorities 77% (N = 117) of the sample.

The mean age was 20.9 with a standard deviation of 2. The missing data (N = 10) for age was replaced with the mean. For gender, 63.2% were female (N = 103) and 36.8% were male (N = 60).

## HYPOTHESIS TESTS

### 1. The Effects of Text Formats: Condition

H1 suggested that subjects reading from hypertext documents would have higher recall scores than those reading identical information from traditional linear-text, both on computer screens.

ANOVA was used to test whether computer text formats, which represent hypertext and traditional text, affected the number of correct answers on a recall test. Text format had no significant effect on recall scores [$\underline{F}$ (1,161) = 2.5, $\underline{P} \leq .116$] for the Latin America Article while the text format had a significant effect [$\underline{F}$ (1,161) = 3.0, $\underline{P} \leq .085$] on recall scores for the Segregation Article, but in the opposite direction of the hypothesis.

In the Segregation Article, the average recall factor score for the hypertext was -.13 while the recall score for the traditional text was .13 (Figure 1).

In sum, the recall score for the traditional text was higher than the recall score for the hypertext; i.e., those reading from traditional text had higher recall scores than those reading identical information from hypertext documents.

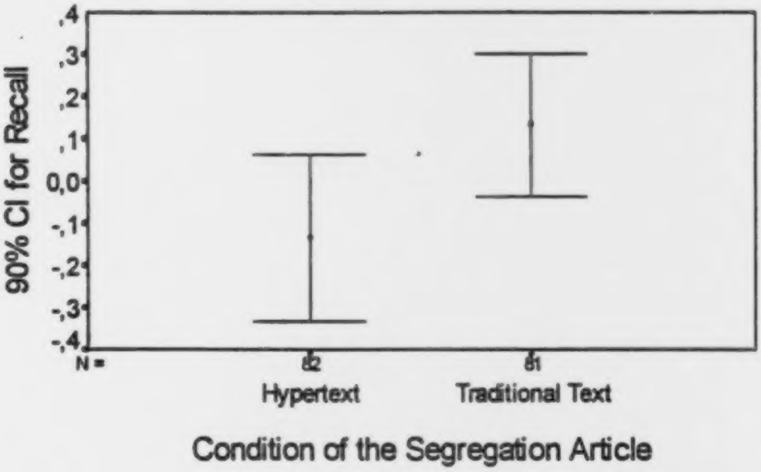

**Figure 1. Mean and CI for Recall by Condition for the Segregation Article**

## 2. The Effect of Gender

H2 proposed that when reading a traditional text, female subjects would have higher recall scores than male subjects. An ANOVA model was used to test whether gender affected the number of correct answers on the recall test.

The results did not support this hypothesis and indicated that males' scores were higher than females' scores regardless of computer text formats. For the Latin America Article, the effect of gender [$\underline{F}(1,161) = 8.3$, $P \leq .005$] was significant (Figure 2).

For the Segregation Article, the effect of gender [$\underline{F}(1,161) = 2.5$, $P \leq .117$] was not significant. When reading the traditional text version of the Latin America Article, the mean of male subjects' scores was .47 while the mean of female subjects' scores was -.1.

When reading the traditional text version of the Segregation Article, the mean score of male subjects was .33 while the mean score of female subjects was 0.2; however there is a text effect such that those reading traditional text learned more regardless of gender.

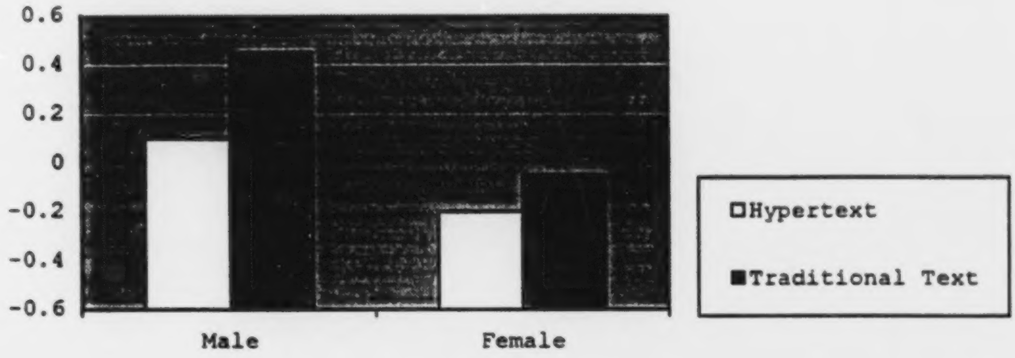

**Figure 2. Recall for the Latin America Article**

H3 suggested that male subjects would have higher recall scores than female subjects when reading hypertext.

The result of the analysis showed that male subjects' scores were higher than female subjects' score regardless of computer text formats, but only the gender effect for the Latin America Article [F(1,161) = .083, P ≤ .005] was statistically significant.

There also was a gender difference in how much time subjects spent each week on World Wide Web sites [T(1,152) = 2.68, P ≤ .004]. The mean of male subject's time was 181 minutes per week while female subjects spent 97 minutes on the average on World Wide Web sites.

In addition to the time difference for World Wide Web use, there was a gender difference for the Computer use and ownership index [T(1,161) = 1.31, P ≤ .096]. Male subjects (Mean = .11) had a higher score on computer ownership and use than female subjects (Mean = .- .07).

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## 3. The Effect of Gender Constancy

H4 suggested that gender constant male subjects would have higher recall scores when reading from hypertext than non-gender constant males.

This hypothesis was not supported. The effect of male subjects' gender constancy was not significant [$F(1,16) = .40$, $P \le .53$] when male subjects read the hypertext for the Latin America Article.

Also, the effect of male subjects' gender constancy was not significant [$F(1,24) = .97$, $P \le .33$] when male subjects read the hypertext for the Segregation Article.

The fifth hypothesis suggested that female subjects with gender constancy would have higher recall scores when reading from traditional text than those with non-gender constancy.

An ANOVA was used to test the effect of female gender constancy on subjects' recall scores. There was no significant effect of female gender constancy [$F(1,39) = .32$, $P \le .57$] when female subjects read the traditional text for the Latin America Article nor was there a significant effect of female gender constancy [$F(1,34) = .22$, $P \le .64$] when female subjects read the traditional text for the Segregation Article.

## 4. Controlling other variables, Gender and Text Effects on Recall Scores

1) Controlling for the computer use and ownership, when reading from hypertext, males will have no better recall scores than females.

An ANOVA showed that the gender effect [$F(1,161) = 8.65$, $P \le .004$] remained significant when the degree of computer use and ownership was controlled for with the Latin America Article. For the Segregation Article, the effect of gender [$F(1,161) = 2.34$, $P \le .13$] remained not significant at the $p \le .10$ level while the effect of text formats [$F(1,161) = 2.9$, $P \le .09$] remained significant when controlling for computer ownership and use index.

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2) Controlling for subjects' easiness of use and familiarity with hypertext, when reading from hypertext documents, males will have no better recall scores than females.

When controlling for hypertext easiness and familiarity, there remained a significant gender effect [$\underline{F}(1,161) = 7.8$, $P \leq .006$] for the Latin America Article. One interesting finding is that a text format effect [$\underline{F}(1,161) = 2.9$, $P \leq .088$] emerged here for Latin America Article. On the other hand, the effects of text formats [$\underline{F}(1,161) = 2.4$, $P \leq .12$] disappeared when controlling for the hypertext easiness and familiarity index for the Segregation Article.

For the Latin America Article, originally there was a significant gender effect [$\underline{F}(1,161) = 8.3$, $P \leq .005$] and no significant text format effect [$\underline{F}(1,161) = 2.5$, $P \leq .116$].

However, when controlling for Hypertext easiness of use and familiarity, the text format effect emerged in addition to the gender effect. For the Segregation Article, the text format effect was significant [$\underline{F}(1,161) = 3.0$, $P \leq .085$]; however, the effect of text format disappeared when controlling for Hypertext easiness of use and familiarity.

3) Controlling for subjects' income, when reading from hypertext document, males will have no higher recall scores than females.

The gender effect [$\underline{F}(1,152) = 6.48$, $P \leq .012$] remained significant and the text format effect (condition) remained insignificant when income was controlled for the Latin America Article.

The effect of condition [$\underline{F}(1,152) = 3.96$, $P \leq .048$] remained significant when income was controlled for the Segregation Article. One interesting finding is that the text format effect (condition) became more significant.

Next, controlling for all three variables; the computer use and ownership, the hypertext easiness and familiarity, and income, ANOVA was conducted for testing the effects of gender and condition for both articles.

The gender effect [$F(1, 152) = 6.46$, $P \leq .012$] remained significant for the Latin America Article and the text format effect

[$F(1,152) = 3.24$, $P \leq .074$] remained significant for the Segregation Article.

## POST HOC ANALYSIS

There were several interesting correlations for the male subjects. The masculine index had correlation with income ($r=.25$, $P \leq .03$). The higher the subject's income, the more likely that he possessed masculine characteristics. Also, the computer use and ownership index was correlated ($r=.41$, $P \leq .001$) with the hypertext easiness and familiarity index. However, the hypertext easiness and familiarity index did not have any relationship with subjects' recall scores. There was a strong correlation between the masculine index and feminine index ($r=.44$, $P < .001$).

On the other hand, for the female subjects, the hypertext easiness and familiarity index was correlated with recall of the Latin America Article ($r = .20$, $P \leq .02$), and recall for the Segregation Article ($r = .26$, $P \leq .004$), and Total recall for both articles ($r=.29$, $P \leq .002$). The hypertext easiness and familiarity index affected female subjects' recall, but not male subjects' recall.

For female subjects, the masculine score was negatively correlated with recall on the Segregation Article ($r = -.17$, $P \leq .05$) and total recall for both articles ($r = -.19$, $P \leq .03$). The higher the female subjects' masculinity score, the lower the recall for the Segregation Article and total recall for both articles. Also, for females, there was a correlation between masculine characteristics and the computer use and ownership index ($r = .21$, $P \leq .02$). The higher the masculine score, the greater the probability that the female subject owned a computer or had access to a computer. There was a strong correlation between the masculine index and feminine index ($r=.311$, $P < .001$).

## SUMMARY

In this study, subjects reading from traditional text documents showed better recall scores than those reading identical information from hypertext documents. However, recall seems to be affected by the structure in which the information was presented under certain conditions. For example, the text format had a significant effect for the Segregation Article, but did not have a statistically significant effect on the recall scores for the Latin America Article. Those reading the article from the traditional text had higher recall scores than those reading identical information from hypertext documents in general.

Gender had a significant effect on the subjects' recall score for the Latin America Article while the effect of gender was not significant for the Segregation Article. Male subjects' scores were higher than female subjects' score regardless of the text format.

The hypotheses with gender constancy were not supported regardless of subjects' gender. One interesting finding regarding male gender constancy was a male gender constancy effect on the Hypertext Easiness of Use and Familiarity index. In fact, gender inconstant males had higher scores on this index than did the gender constant males. In particular, there was a significant effect of male gender constancy on familiarity with hypertext. Gender inconstant males were more familiar with the term hypertext than gender constant males.

Controlling for all three variables (the Computer Use and Ownership, the Hypertext Easiness and Familiarity, and Income), the gender effect remained significant for the Latin America Article and the text format effect remained significant for the Segregation Article.

There were several interesting correlations for the male subjects. The computer use and ownership index correlated with the hypertext easiness and familiarity index. However, the hypertext easiness and familiarity index did not have any relationship to subjects' recall scores.

On the other hand, for the female subjects, the Hypertext Easiness and Familiarity index was correlated with recall of the Latin America Article and the Segregation Article.

For female subjects, the masculine score was negatively correlated with recall on the Segregation Article and total recall for both articles. The higher the female subjects' masculinity score, the lower the recall for the Segregation Article and total recall for both articles. Also, there was a correlation between masculine characteristics and the Computer Use and Ownership index. The higher the masculine score, the greater the probability that the female subject owned a computer or had access to a computer.

## LIMITATIONS

This study had several limitations that should be considered for interpretation of the research and suggestion of further studies.

One limitation of this study was the self-reporting of gender constancy. The type of person an individual considers himself/herself to be is not necessarily a true or accurate representation of his or her actual personality. However, a counter argument can be made; that because gender identity is a person's perception about himself/herself, self-reporting is a reasonable way to measure gender constancy.

To measure gender constancy in this study, the Bem scale was used to determine whether the subjects were more "feminine" or "masculine." Because the scale has been criticized for being outdated, the interpretation of the results should be carefully drawn. A more updated and accurate instrument to measure gender identity is needed.

In this study, gender constancy was categorized into a simple division of gender "constant" or "inconstant." In addition to this, there was the problem of using high, moderate, and low cut-points, with one-third of subjects from each gender placed in each of the three categories. Because of this categorization, it is possible that the subjects were not "high-moderate-low" masculine or feminine in the real world, but only so relative to the other subjects in the study. The subject pool determined the cut-point. Therefore, this operational definition of gender constancy should not be considered as an absolute concept, but rather a relative indication of the characteristics of the subjects in this study.

The findings of this study reveal that the structure and presentation of text influence how well information is recalled. The study results indicate that hypertext systems may cause disorientation in the learning process and hinder factual recall. Many scholars have suggested that hypertext systems can overload cognitive processing capabilities and encourage over-simplification of the information read. However, this premature conclusion is dangerous and further careful research is required to determine whether or not reading from hypertext actually has detrimental effects on learning.

In the instant case, there was a gender effect with the Latin America Article, while there was a text format effect with the Segregation Article. The questions in the Segregation Article were carefully tested for gender neutrality while the questions in the Latin America Article were not. Because the Latin America questions were not tested for gender neutrality. It is possible that many other studies that have shown "gender effects" have not adequately tested the gender neutrality of the instrument. Therefore, previous and future studies must be carefully examined to ensure that investigators are not finding gender effects simply by utilizing a gender-biased instrument.

Furthermore, subjects scored higher when reading the Segregation Article in traditional text form than in hypertext, while there was no effect for text format in the Latin America Article. The Segregation Article consisted of five paragraphs that treated roughly the same subject; that is, the battle against segregation in America. On the other hand, the Latin America Article presented information about five separate countries, and therefore dealt with five different topics. Hypertext functions by allowing students to follow their train of thought and click on the links that interest them. Thus, for an article such as the Latin America Article which switches to another country at every link and therefore does not require that a subject follow a traditional order of introduction, body and conclusion, text format would not show an effect on recall.

On the other hand, in the Segregation Article, the text format effects were shown. This could be because this article followed a traditional format; that is, an introduction, body and conclusion. Consequently, students who read the hypertext article may have experienced disorientation when they read the article by selecting links rather than in its natural order. Students who read the traditional text read it in its natural order and therefore may have formed a better recollection of the article's content. This implies that educators and instrument designers should carefully select the format of the information that they give their students or subjects, for it may have an effect on their information processing.

## SUGGESTIONS

The research literature usually asserts the positive role of hypertext in learning, based on the assumption that hypertext provides selective attention or reader control. Many educators believe that selective attention determines which information is processed or ignored; therefore, it accelerates information processing. It is worth examining "selective attention," in terms of hypertext use, more closely to evaluate its implications for the future, regarding factual overall recall and recall of information of interest to subjects.

Considering the gender differences that exist in learning to use computers, the findings in this research may give clues for further research. However, because the study contains the several limitations regarding the measurement of gender constancy, more careful examination of the effect of gender constancy is highly required. This avenue is worth exploring, also.

Although gender was a significant factor in determining how frequently subjects used a computer, not much research has been conducted in this area. In the study, comparisons between male and female subjects' scores showed two interesting trends: Female subjects' recall scores varied less between the traditional text and hypertext documents than male subjects' recall scores and male subjects' recall scores differed significantly depending on text format. Further investigation of the effect of gender constancy in males should be examined to discover which character types are more comfortable with hypertext. Students who use the World Wide Web on a regular basis may be more comfortable with hypertext than those students who use computers solely for the purpose of writing papers.

Under the Bem scale, gender-constant males classified themselves as 'dominant,' 'aggressive,' 'competitive,' 'athletic,' etc. whereas gender-inconstant males considered themselves as not possessing these traits to the same extent as the gender constant males. Putting these findings into a real-world context, perhaps gender constant males enjoy more gender constant activities where they can express these personality traits, such as football or other sports. On the other hand, gender inconstant males may have little interest in engaging in these activities. Rather, they might tend to enjoy more introverted activities, such as surfing the Web and computer programming. Although these suggestions reflect common stereotypes, they seem to be supported by the data in this study. For example, gender inconstant males were more comfortable with hypertext and did better on hypertext recall than the gender constant males.

Based on past studies of gender differences regarding computers, it is logical not only to examine differential responses by gender to new types of information operating systems such as computers, but also to address the social, cultural, political, and economic implications of new technologies. Furthermore, we must carefully examine why these differences occur, considering the multiple ways in which individuals can learn how to use a new technology in accordance with their abilities, interests, and values.

Also, these different approaches to learning how to operate computers are subject to differential responses based on gender, race, and socioeconomic status. Isolated and simplistic conclusions from gender studies, which assert that men and women are simply physiologically or biologically different, hinder the possibilities of narrowing the present gender gap and exacerbate a present stereotype against women. The consequence of such fatalistic logic is that women are obstructed from gaining the new knowledge that already has been acquired by their male counterparts in the new technology era.

For this reason, a careful examination of individuals' (males and females) computer attitudes and learning patterns will help researchers understand the complex relationships among individuals' attitudes, abilities, and experiences; the nature of the new technologies, such as computers; and further, individuals' cultural, social, economic, and educational environment. This integrated method will suggest solutions to narrow the present gender gap, not only on the individual level but also on the social level. If scientists fail to integrate research from the social level, understanding human cognitive processes will continue to be limited.

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# THE ROLE OF LOCAL GOVERNMENT IN INFORMATION AGE AFTER THE PASSAGE OF THE TELECOMMUNICATIONS ACT OF 1996

By

Kuo-Feng Tseng

Ph.D. Student of Mass Media Ph.D. Program
Telecommunication Department
College of Communication Arts and Sciences
At Michigan State University

517-355-3207
1569 L Spartan Village, East Lansing, MI, 48823
tsengku1@pilot.msu.edu

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## Abstract

# THE ROLE OF LOCAL GOVERNMENT IN INFORMATION AGE AFTER THE PASSAGE OF THE TELECOMMUNICATIONS ACT OF 1996

Convergence of communications technology, such as cable television, telephone, and computer network, has made those primary separate industrial players enter each other's service. The passage of the Telecommunications Act of 1996 removed barriers to entry and affects cities in management of rights-of-way, local zoning authority and municipalities' ownership in the integrated telecommunication services. This paper examines related policies of cable television, telecommunications, and wireless services from nineteen Michigan communities, to provide basic principles of regulatory instruments for other municipalities.

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## Introduction

With convergence of communications technologies, telephone, cable television, computer networks, and wireless telecommunications are about to enter one another's service. The passage of the Telecommunications Act of 1996 was to eliminate barriers to entry and spur competition, but the arrival of integrated broadband networks upsets carefully drawn government jurisdictional lines between federal, state, and local authorities (Baldwin, McVoy, & Steinfield, 1996). The new law seems to envision a dual regulatory regime incorporating roles for both the FCC and state commissions, and to resolve federal-state conflicts, such as federal technological standard and consistent regulation across state boundary, to keep industries competitive and prosperous.

On the other hand, however, local governments are the regulatory regimes that industry players directly contact to build the telecommunications infrastructures. They play the key roles of governmental barriers or creating incentives to attract industry's investments. Entman (1992) suggested that the new law had widespread implications for local governments as not only regulators, but also users and providers of telecommunication services. Cities and counties are second only to the federal government in consumption of telecommunications services. Local governments collectively constitute the largest single investor in telecommunications businesses that use wires in the public rights-of-way (Tageldin, 1995).

What will the local government play in the new era? What local authority instruments should be included in their city ordinances to keep industry competitive and to attract investments? This paper is about to analyze the present telecommunications policies of nineteen Michigan communities. From the content analysis and categorization of cities' authorities to make a matrix for comparison, we can find the role of local government, its regulatory instruments, and its influences to the community and communications market in the information age.

## The Information Superhighway and Impacts on Municipalities & Communities

In the information superhighway era, phone companies, publishing companies, Hollywood studios, broadcasters, cable TV operators, and information technology outfits will go racing into each others' business. The rearranging industries will account for $1 trillion in annual revenues by 2000 (Business Week, April 8, 1996). To accomplish this, for example, telephone companies are laying fiber across the nation, and the major expense of laying fiber is from the curb to the home – a "last-mile" link that may cost between $150 billion and $400 billion to deploy (Blake and Tiedrich, 1994).

The construction of advanced telecommunications in society today, is seen to stimulate a long wave of innovation through all areas of society, creating economic growth in new areas and markets and a resulting shifting in the makeup and functioning of urban economies (Freeman, 1987). Sell and Jacobs (1994) found that telecommuting appears to enable organizations to be more productive at lower cost, and individuals to increase control over work, time, and living space. Wilson (1992) said that telecommunications advances could significantly contribute to rural community development through the means of vertical and horizontal communications to take advantage of cost. Tageldin (1995) also said that cities and counties could tap increased connectivity to enhance public access to government information, to increase civic participation, and to better provide health, education, and economic benefits to citizens.

However, Marvin (1997) found that although telecommunications technologies help increase the efficiency of production processes and reduce the need for material and energy inputs, they also stimulate new demands for travel, increase the attractiveness of transport networks, and disperse land-use pattern. Urban environmental policy needs to acknowledge these contradictory effects.

After the passage of the Telecommunications Act of 1996, several changing regulatory instruments related to local governments' authorities will affect industrial investments and community development. Moulder and Hall (1995) found that legislation introduction so far has covered the gamut of issues: competition, access and interconnection, preferential rates, and protection of consumers from abuse. However, Graham (1994) concluded that the continued importance of the national level as a factor conditioning the development of urban telematics policies. Different policy styles and different institutional alliances are necessary in different cities in order to begin the process of policy innovation in this new and complex area.

## The Prior Authorities of Municipalities in Regulating Telecomm Industries

Originally, intrastate telephone service is regulated by state governments, and local governments have no role. On the other hand, cable service is franchised by local governments, and states play a role in regulating pole attachments, theft of service, and a few other areas. In almost all states, cable systems are franchised by a local government - the city grants rights-of-way to go over and under streets and bridges. In return for this privilege, the city collects a franchise fee. Federal law limits the fee to 5% of all revenue, which is the amount that most cities charge. At the time that most cable franchises were granted, local franchising authorities had published an Request For Proposal (RFP), taken applications for the franchise, selected the single most desirable applicant, rejected the others, and written a franchise agreement for about 15 years with the winner. Cities usually request that the public, educational, and government (PEG) channels be set aside for public service and public use.

After a franchise agreement is signed, the city monitors the performance of the cable operator to make sure the system is built according to schedule and technical standards, resolves customer complaints that are not settled with the cable company, and administers the PEG channels. The city plays a role in rate regulation along with the FCC. At renewal time, the city, the operator, or both ascertain cable-related community needs. Renewal is usually for 7 to 10 years. If the operator had not met criteria of community needs, renewal could be denied after a formal administrative proceeding (Baldwin, etc. all, 1996).

On the other hand, telephone services have been heavily regulated by the state public service commissions. Traditionally, these commissions have granted exclusive franchises for switched local telephone service. In return, they have exercised great control over the prices that telephone companies can charge. The FCC manages spectrum and issues licenses of cellular, personal communication services (PCS) and other wireless communications services. Local governments regulate the construction and location of towers and antennas through their authorities for local zoning and land use regulation.

## Changes of Municipal Authorities After The Telecommunications Act of 1996

The passage of the Telecommunications Act of 1996 affects cities' authorities in several ways, such as management of rights-of-way, local zoning authority and municipalities' ownership in telecommunication services. The major goal of this Act is to keep communications industries competitive in the nondiscriminatory manner, but local authority could still be able to manage public rights-of-way requires fair and reasonable compensation, and reserves local zoning control over wireless tower siting.

### *Management of rights-of-way*

Beaumier (1996) said, although the new Act professes to preserve local regulatory powers over the rights-of-way, and specifically, the state and local government right to assess reasonably compensation for the use, it impose a loose federal anti-discrimination overly. Under section 253 (a), no state or local government may "... prohibit or have the effect of prohibiting the ability of any entity to provide any interstate or intrastate telecommunication service". However, Tabin and Miller (1996) thought that local governments also won a key: The inclusion of language to guarantee that "nothing in this section affects the authority of a state or local governments to manage the public rights-of-way or to receive fair and reasonable competition from telecommunications providers, on a competitively neutral and nondiscriminatory basis, for use of the rights-of-way..." (47 U.S.C. 253(c) ). This section's "barrier to entry" clause should not interfere with local governments' ability to manage their rights-of-way and to be compensated for their use, so long as they manage and charge compensation for the rights-of-way in a "nondiscriminatory" fashion.

### *Cross-services between telecommunications and video service*

Section 303 of the new Telecommunications Act prohibits local governments from using their cable franchising authority to require telecommunications services by a cable operator. However, this section's restrictions do not prohibit local governments from treating cable operators like other telecommunications providers, to the extent cable operators provide telecommunications services. Cable operators providing telecommunications services can be subjected to the same requirements as other telecommunications providers for compensation for use of rights-of-way.

Open Video System (OVS) is a video delivery system in which the local telephone operator makes at least two-thirds of the capacity available to unaffiliated programmers on a non-discriminatory basis. OVS providers that are certified by the FCC are exempt from obtaining a local cable franchise. They will, however, have to meet PEG channel requirements set by the FCC, and can be required to pay the local governments fee in lieu of a franchise fee (Beaumier, 1996).

### *Local zoning authority*

FCC has issued a series of rulemakings in which it seeks comments on its ability to preempt virtually all local zoning decisions that affect local telecommunications or broadcast towers, antennas or other transmission facilities. Tabin (1996) said that the FCC tentatively concluded that it has the authority to consider whether local facility siting moratoria may prohibit or have the effect of prohibiting the ability of wireless service providers to offer service in violation of Section 253(a) of the Act (governing barriers to entry). The rules would place the burden on the local government to justify any restriction on what the broadcaster wants to do. The only permissible justifications would be for health and safety, apparently not aesthetics, which will raise a constitutional argument under the 10th amendment. The FCC suggested that it have jurisdiction over any dispute where the provider claims that the city decision was based on the environmental effects of radio frequency emissions.

However, the legislation protects from federal intrusion any local zoning decision concerning wireless facilities, so long as municipal zoning decisions do not unreasonably discriminate among providers of functionally equivalent services or preclude cellular service from a community. All challenges to municipal zoning decisions, except for those dealing with environmental effects of radio frequency emissions, would have to be appealed to the courts, rather than the FCC. As a result, the negotiated agreement largely prohibits the FCC from preempting local decisions regarding zoning.

**Research Questions**

After the passage of the Telecommunications Act of 1996, the deregulation of barriers to entry in cable and telephone companies would increase competition between them. Internet will gradually become an important media for electronic communication and commerce. In addition, wireless services, such as cellular phone, PCS, Multichannel Multipoint Distribution System (MMDS), and Direct Broadcasting Satellite (DBS), play a more and more important competitive role to telephone, video and data communications services. On the other hand, to implement those telecommunications infrastructures, local governments directly play a key role to spur competition and attract investment. This research paper is about to analyze the telecommunication policy and ordinances of nineteen Michigan communities. The main goals are to find out:

1. What are the changes of regulatory instruments for the nineteen Michigan local governments to regulate industries in the information superhighway age, after the changes of local authorities in the 1996 Act?
2. What are the impacts of those changes for those local governments and communities?

## Research Methods

The first step was to select the communities for examination. Nineteen communities and township were chosen. These communities included: Ann Arbor, Birmingham, Canton Township, Dearborn, Detroit, East Lansing, Farmington, Flint, Grand Rapids, Holland, Lansing, Lansing Township, Livonia, Marquette, Negaunee, Southfield, Sterling Heights, Troy, and Wyandotte. This was by no means a random sample, but each city possessed unique characteristics in terms of its telecommunication strategy (See Table 1). After collecting the ordinances, city codes, and franchises agreement of each community, it is convenient for comparison to make policy matrices by categorizing the essential instruments of local authorities. While collecting data, some cities are processing new policy, and it is required to continuously include updated policy until done.

### *Collection process*

Copies of local ordinances and related policies and procedures were initially requested via telephone contact. However, this method was less effective than the subsequent site visits. Researchers visited community libraries and city halls for diverse documents, including copies of ordinances, budget information, and franchise agreements. As needed, they met with officials who explained local telecommunication procedures and the process of local government in general. As materials were retrieved, researchers summarized the data and assigned these to defined final matrix categories.

### *Matrices and categories*

The local telecommunication policy matrices have been divided into three broad categories: cable matrices, telecommunication matrices, and wireless matrices. Most communities have had significant experience with cable communications and as result have detailed policies and ordinances. A fewer number of communities have detailed policy information addressing new telecommunication services, specifically wireless. The matrices have been divided to detail the differing nature of all policies. Those categories are usually decided by the characteristics of industries. For example, PEG channels and rate regulation for cable television; use of rights-of-way and local zoning are generally the two biggest policy areas affecting telecommunication companies; and safety as well as land use are the major concerns to communities.

## Collected Data

Table 1 shows the status of each city's cable, telecommunications and wireless service policies. Since historically local government has the authority to issue cable franchise, in our studies, almost all cities have very specific local cable TV policy, except for the city of Negaunee, which also owns cable television system. Less than half of communities have telecommunications policies, and only few of them have as specific policies as cable. At the time of studies, only Ann Arbor, Lansing and Troy have had ones. However, after the passage of the Telecommunications Act of 1996, many cities are revising their traditional telecommunications policies to adopt new services and regulations. There is still no specific ordinance for wireless services at this moment, because they are new services and communities have limited authorities to regulate. Livonia has a draft wireless policy that is undergoing municipal review. However, most of them have general policies of local zoning regulations included in city codes, such as restriction and obligation for land use, construction and urban planning.

----- Table 1 about here -----

### *Cable Policy Matrices*

Most communities have well-defined policies for cable systems (cable system is defined as one-way video distribution system). From table 2, the cable television-systems of Holland, Negaunee and Wyandotte are owned and operated by the cities. The city of Negaunee does not have specific cable ordinances. Most of cities request 3 or 5 percent franchise fee of annual gross revenue, and some of them ask additional 1 to 2 percent for maintaining PEG channels, such as Ann Arbor, Canton Township, Lansing Township, and Sterling Heights. The franchise fee usually contributes little, around 1%, of city's general fund revenues, but the ratio in the city of Negaunee was over 10%. The FCC authorizes local government to regulate basic cable price, and most of them include the basic rate regulation in their ordinances. Most cities issue fifteen years of franchise term, and ask for 550 MHz or 50 channels of cable systems. Cities emphasize the requirement of PEG channels, and they usually request each channel for public access, education, and government use separately. However, some cities, such as the city of East Lansing, and Livonia, ask for around 10 channels for PEG uses, which takes 20 to 25 percent of total channels.

----- Table 2 about here -----

### *Telecommunications policy Matrices*

Telecommunications policy here is referred to a two-way voice and data communications network, not including video services. Holland owns and leases its own fiber-optic telecommunication system. The city ordinances of East Lansing and Lansing include some sections regarding telecommunication governance as parts of broader categories such as cable. However, they are not pure telecommunication-oriented ordinances as defined in this matrix. Ann Arbor and Troy have well-defined and organized telecommunication ordinances. The ordinances of Ann Arbor are the most recent ones, becoming effective March 31, 1997.

From Table 3, unlike cable television, most of cities do not clearly request certain percentage compensation of telecommunications service in their policies or city codes. Some cities, such as Birmingham, Dearborn and Troy, impose 3 or 5 % of annual gross revenue as franchise fee in their new policies. Others charge compensation by measuring the cable or fiber lines implemented. Most of the telecommunications companies usually have 10 years contracts and 5 more years by renewal. Like cable systems to provide free video access for schools and libraries, some cities request telecommunications systems to provide fiber links to schools, library or government buildings.

----- Table 3 about here -----

***Wireless Telecommunications Policies Matrices***

Although some city codes are related to local zoning regulation, most of them are about house construction, and little information is for wireless telecommunications. The fact reflects that city has limited authority on the new developing wireless services. In Table 4, Birmingham, Detroit, Holland, and Southfield have more specific regulations to wireless services. Livonia is in the process of designing regulations for wireless services, and notes included here are from the *proposed* ordinance. At this time, the remaining communities do not have separate explicit policies for wireless telecommunications.

Birmingham, Holland, and Southfield allow five years lease for special land uses, and have maximum about 25 years. Unlike cable or telecommunication services, there is no franchise fee collected from service providers, and communities can only charge rent for land use. Local policy concerning PCS and wireless systems focus not on access to public rights-of-way but zoning, and tower siting and height restrictions are the most prevalent. In addition, Detroit, Holland, Livonia, and Southfield also encourage wireless services providers to share a co-location tower. Promoting a less intrusive environment and controlling proliferation of cellular towers in residential and pedestrian-oriented commercial neighborhoods is a main goal of policy makers. When reviewing applications for personal wireless service facilities, a main consideration is the protection of the health, safety, and integrity of residential neighborhoods and of the general public. A second consideration is the protection of each municipality environment by promoting compatible urban design standards for telecommunications facilities. Screening is required in many communities in accordance with residential zoning provisions, in order to reduce visual impacts caused by wireless facilities.

----- Table 4 about here -----

## Discussion

Moulder and Hall (1995) surveyed over one thousand local communities and they found that local governments can influence telephone, utility, cable television, and telecommunications companies in four direct ways: (1) issue license or franchises, (2) regulation, (3) control rights-of-way, and (4) own or offer services themselves. Their survey data only show the percentage of what method implemented by local communities to regulate industries. However, this paper in detail analyzes content of communication policies and city codes of nineteen Michigan communities.

### *Licensing or franchising process*

Moudler and Hall (1995) found that the right to issue franchises to cable television companies is reported by the highest percentage of local governments (86.4%). They found, anytime that a local government controls the issuing of licenses or franchises, it is in an advantageous position because there are usually opportunities to negotiate particular services and access for more people. For example, a local government might award a franchise if a cable company agrees to wire the local public library system or a new low-income housing development. In this study, some communities, such as Ann Arbor, Canton Township, Farmington, Lansing Township, and Sterling Heights, also request 1 to 2 percent of annual gross revenues and equipment to promote PEG channels. Recently, for the enacting new telecommunications policy, cities of Ann Arbor, Birmingham, and East Lansing also ask for free access data network to public school, library, and city buildings.

***Public rights-of-way***

Tageldin (1995) refers to Miller that public rights-of-way are the most valuable property rights now in the hands of any level of government. The loss of franchise fees by local government and the loss of regulatory authority for public rights-of-way mean more than financial loss; they mean a loss of empowerment for local government. Local governments no longer will be allowed to look out for their own and their citizens' best interests in terms of what types of telecommunications systems are brought into their communities. Local governments invest $28 billion a year in acquiring and maintaining public rights-of-way with nominal compensation from telecommunications and cable providers (Tabin and Miller, 1996). Without local management of public rights-of-way, private industries nationwide would receive billions of dollars in taxpayer subsidies.

The U.S. Congress preserved what local authority was left over rights-of-way but required that any rights-of-way fees be competitively neutral and nondiscriminatory. The Michigan Legislature severely limited local authority to require fees exceeding the fixed and variable costs of maintaining the rights-of-way. Local governments need to review existing ordinances concerning the use of public rights-of-way to ensure that they exercise all legitimate means to minimize degradation of essential public works infrastructure. They should also attempt to maximize their opportunities to receive fair compensation for rights-of-way use.

With this traditional local authority protected, local governments will need to put in place procedures for negotiating non-discriminatory rights-of-way agreements with a variety of telecommunications providers. Many communities will want to enact general telecommunications ordinances to provide a framework for agreements and compensation. These ordinances will build on the cable franchising experience and should be tailored for a particular city or county's goals and needs. For example, in this study, instead of charging by construction length, Birmingham, Dearborn, and Troy try to charge 3 to 5 percent of annual gross revenue to compensate for the use of public rights-of-way from telecommunications network.

### *Franchise fee*

Baldwin, McVoy, and Steinfield (1996) mentioned that federal law limits the cable franchise fee to 5% of all revenue, which is the amount that most cities charge. The fee has generated substantial revenue over many years for most cities. For a city of 100,000 population, a franchise fee of 5% generates about half a million dollars annually. The fee covers regulatory expense and the value of the rights-of-way. In this study, cities charge a franchise fee of 3or 5 percent of annual gross revenue. However, most cities' cable franchise fee revenues only account for around 1 percent of total general fund budget in 1996-1997. Negaunee, which owns and operate cable system, is the exception where the cable revenue accounts for 10 percent of general fund. However, although Holland and Wyandotte also own cable systems by themselves, the cable revenues do not account for a large proportion of their general fund.

If a city gives up the rights-of-way without charge to a private profit-making company, it could be argued that the city is not acting in the best interests of the citizens or even that the city has violated the doctrine that asserts that public rights-of-way may not be used for private enterprise, only for the public convenience. Therefore, the city might extract the maximum fee, taking advantage of its control of the essential rights-of-way. On the other hand, because communication facilities are essential to the livelihood and well-being of the community, the city might waive the "value" of the rights-of-way to encourage development.

Whatever the fee, it can be passed on directly to the users of the services. In effect, the users of the video service are paying the whole community for the rights-of-way that belong to the whole community. However, this could be shortsighted if the communication facilities represent a general benefit to the community. At least the community should be aware of these revenues from the telecommunications provider instead of from the consumers and business within the community. For example, the city of East Lansing, passed an ordinance that assesses no fees against revenues for operation of advanced telecommunications services, beyond cable, well ahead of the similar state and federal laws. The result was almost immediate development of new services in the community (Baldwin etc. al., 1996)

***Rate regulation***

Rates for all expanded cable programming service will be deregulated as of March 31, 1999. In the case of "small systems" (50,000 subscribers or fewer, not affiliated with an operator serving over 1% of the U.S. and with less than $250 million gross revenue), expanded basic rated are deregulated immediately. Basic service remains regulated as long as there is not "effective competition." When the Act was enacting in Congress, it would expect to change the definition of a small cable system from one with 1,000 subscribers to one with 15,000. The order also would increase the definition of a small MSO from one with 250,000 subscribers to one with 400,000. Under the order, more than 66% of cable companies would be defined as small cable systems, and small companies would serve 12% of cable subscribers. The current definition covers 3.5% of cable subscribers (Broadcasting and Cable, May 8, 1995). Based on the new definition of small cable systems, several communities, such as Birmingham, Farmington, Holland, and Lansing Township, may deregulate their expended cable prices immediately. Some communities, like Troy or Detroit, are beginning to attract new entrants from telephone companies to directly compete the incumbent cable systems, and they may also deregulate basic cable television rate.

### *Franchise granted and Terms*

Baldwin etc. all (1996) said, at the time that most cable franchises were granted, local franchising authorities had published an RFP, taken applications for the franchise, selected the single most desirable applicant, rejected the others, and written a franchise agreement for about 15 years with the winner. Moulder and Hall (1995) also found that often the cost of the initial cable wiring is so high that a local government contracts with one provider who performs the wiring and then provides the cable television. A second provider does not become part of the picture until the initial franchise agreement expires, which can take ten to 15 years. In this study, most of cities did also grant 15 years to cable systems, and around 10 years to telecommunications systems. Although the FCC does not regulate it, most of cities have unofficially agreements to grant the same franchise term to industry.

### *Wireless and Environment*

Zoning News (1991) mentions that with 10 years one-fifth of all telephone communications will be transmitted via cellular units. Rather than requiring a high-powered single transmitter site at a high elevation, cellular telephones use low power and multiple transmitters. The country already has one wireless service – cellular – which built 17,000 antennas in 13 years. Crowell (1996) said that the number of cellular towers in the United States is expected to increase from 18,000 to over 100,000 by the year 2000. PCS antennas must be no farther than six miles apart, and much closer in urban areas. Many citizens argue that the aesthetic impact of wireless towers, antennas, and satellite dishes lowers residential property values.

Crowell (1996) also said that concerns have been raised over the potential health and environmental problems that electromagnetic radiation from service towers and facilities may create. To protect community aesthetics as well as guard public health and safety, local governments have used their zoning powers to regulate towers by requiring setbacks from residential or commercial structures, imposing height restrictions, and requiring safe zones for failing towers or debris from towers. For example, Detroit, Farmington, Holland, Livonia, and Southfield regulate location of tower and safety design requirement in their cities' codes.

However, local governments lack the policies to accommodate the proliferation of wireless towers and related facilities. Most cities have zoning ordinances that cannot incorporate the land-use requirements of wireless networks without some kind of amendment. As a result, they are using the moratorium to delay construction until they review and update their ordinances. Kao (1997) said that most pointed to the relatively low number of moratoria in the country – only 150 or more out of 28,000 local jurisdictions with some sort of land-use decision-making authority. In the study, Livonia is in the process of designing regulations for wireless services. At this time, the remaining communities do not have separate explicit policies for wireless telecommunications. Some cities of the nineteen communities, Birmingham, Detroit, Holland, and Southfield, have more specific related, but not specific for wireless regulations. Littlejohn (1993) said, as the wireless system continues to expand, both in capacity and in geographical coverage, the increasing need for antennas will unavoidably conflict with land-use planning and zoning laws. He suggests that the federal law should preempt local zoning regulation to promote readily available, reliable cellular service to the entire nation.

Localities, in the exercise of their policy powers, often have adopted restrictions on the size and/or placement of these antennas. Restrictions are enacted for various health, safety, or aesthetic reasons. Unfortunately, the restrictions may significantly hinder or completely block the reception of radio signals. The FCC noted that it did not intend to become a national zoning board reviewing every complaint that comes before it. Rather, it left the construction and enforcement of its rules to local institutions and the court.

### *Municipal Ownership*

For municipalities interested in owning or operating a telecommunications system, the opportunities and benefits might be enormous. As telecommunications companies increasingly deregulated, municipal ownership and operation may soon be the only meaningful role available in the telecommunications sector for local governments as regulatory and franchising roles shrink or vanish. Moulder and Hall (1995) found that local governments most often report authority to own or offer utility services. Approximately 51% report such authority for utilities; 44% for cable television; 23% for telecommunications companies; and 20% for telephone companies. In this study, three of the nineteen cable television systems, Holland, Negaunee and Wyandotte, are owned and operated by the city. The franchise fee of Negaunee has account for 10 percent of general revenue, while others have only one percent.

However, Ramey (1994) said, when a municipality elects to be both regulator and communications service provider, questions arise concerning the allocation of community resources. For example, the City elected to issue municipal bonds and threatened to raise local property taxes to achieve its purpose of overbuilding the existing private provider. In addition, Bearby (1993) said, government ownership of cable television systems illustrates the danger of giving a cable operator the sole authority to determine what its subscribers should view. The 1996 Act may provide opportunities for municipalities that want to get into the business of telecommunications services, and the Act's preemption provision may indirectly authorize this market entry. Any decision by a municipality to enter into the competitive telecommunications service market is not, however, without legal risks. A city's dual role as regulator and market participant may raise constitutional and antitrust issues.

### *Regulatory Symmetry/Parity*

How to integrate the legislation so that there is a regulatory symmetry or parity across all participating industries? Since each industry is starting from a different point under different conditions, there is a question whether symmetry is desirable or necessary (Baldwin, etc. all, 1996). Symmetry suggests the often-invoke level playing field but only when the players have equal opportunities to begin with. Furthermore, there are long-established regulatory precedents, different for each industry that would be difficult to retract. Another concern is that the potential competitors are of unequal strength. Some think that if there is to be competition, particular parties need to be nurtured by favorable policy until they are competent to stand alone.

Asymmetry of regulation can arise from jurisdictional differences, and particularly if cable-based franchises are not treated the same as common carriers, open service systems, or other video services. The most contentious areas are the fees and public service requirements of cable or telecommunications franchisees. For example, Troy requires TCI, the new telecommunications entrant, to obtain franchise, even though it has not required the same of the incumbent Ameritech. TCG-Detroit sues Dearborn that the City was wrongfully seeking rights-of-way fees because none are paid by Ameritech.

One way of deal with the regularity dissimilarities among the converging industries is to try to counterbalance requirements. Since this is an attempt to offset apples against oranges, it is bound to be called unfair by on or more parties. For example, cities will not willingly give up the 5% of cable gross revenues that most are now receiving. Newcomers will be reluctant to pay franchise fees. The open video system option of the telecommunications reform bill does not require providers to pay a franchise fee, but communities may assess a fee for use of rights-of-way not to exceed the cable fee. However assessed, the fees could fall below the cable fee. Should or could, they be made exactly equivalent? It may depend on the circumstances (Baldwin etc. all, 1996)

### *Local-State-Federal structure*

Baldwin, McVoy and Steinfield (1996) concluded that three-tiered regulation is the most possible regulatory regime in future information superhighway era. That is, cable and telephone companies, which already considered themselves heavily regulated, would each be submitting themselves to another layer of regulation - telephone to local authorities, cable to the state. They thought that the local governments are perhaps best able to cope with complaints about services-ordering, billing, repair. Service standards could be established at the federal level so that there was no disparity within a service region for any given providers who would span more than on state. Local governments supervise cable construction in rights-of-way and issue permits for telephone company use of rights-of-way. The permit process would work for integrated broadband systems as well, and presumably, would be implied in the new open video systems structure. Not only would this ensure local control over rights-of-way, but also it could expedite construction since a higher authority might be slower to respond to construction demands.

For both the state-federal and local-federal jurisdictional tensions, the federal government set an overall policy framework, perhaps with floor standards. Within those boundaries, state and localities would be free to set specific terms under the FCC's oversight. Such a system might serve needs for a degree of uniformity across the country, creating a favorable environment for investment and innovation, while allowing for adjustments that fit local conditions.

## Conclusion

Crowell (1996) said that as telecommunications reform creates a new environment for economic and industrial change in cities and counties, local government officials must make telecommunications planning a priority. Inventories of current local telecommunications capabilities will have to be made, existing zoning regulations, and policies granting telecommunications and cable rights-of-way and franchise will have to be reviewed. Strategic alliances among localities, industry, and the community should be explored as well. Entman (1992) also said that the current maelstrom would be an increase in the importance of local government jurisdiction paralleling the rise of local telecommunications competition. In some cases, the issue will be zoning, as for microwave towers or satellite dishes. In others it will be taxes, or cities may seek to become telecommunications vendors themselves.

As we found in this study, most of communities have already had complete cable policy, and few of them have begun to enact specific telecommunications policy. However, only Dearborn begins to submit its proposal for wireless telecommunications policy. As wireless services play a more and more important role, cities should enact related policy quickly. In addition, most importantly, cities will need to reconcile the obligation to manage rights-of-way in a non-discriminatory and competitively neutral manner with the demands placed on a municipal competitor in the telecommunications market. Telephone companies pay the same local fees as cable TV's franchise fees. Cities may even seek jurisdiction over radio-based technologies like PCS. It appears that the real jurisdictional conflicts will come not over zoning, but over such matters as taxes and cities acting as telecommunications providers that might potentially stifle competition.

As Crowell (1996) concluded, it is essential that local governments continue to provide input into the development of FCC regulations and new state laws, as well as monitor court decisions interpreting the new Act. There is no general way to approach the changes brought on by the telecommunication acts. Instead, each local government needs to develop specific solutions to the particular problems faced. However, this paper provides some basic principles of local regulatory instruments from the nineteen Michigan communities, and their experiences definitely can be applied to other municipalities.

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Table 1, Community Characteristics and Policy Status

| | Community | Characteristics | Cable | Telecommunication | Wireless Telecommunication |
|---|---|---|---|---|---|
| 1 | Ann Arbor | Major information center, new telecommunications ordinances in effect. | Specific policy | Specific policy | No policy |
| 2 | Birmingham | Well drafted telecommunications policies | Specific policy | General policy | General policy |
| 3 | Canton Township | Two cable providers with existing competition. | Specific policy | No policy | No policy |
| 4 | Dearborn | PROTECT member. | Specific policy | General policy | General policy |
| 5 | Detroit | Largest city in Michigan. | Specific policy | No policy | General policy |
| 6 | East Lansing | Point of contrast with Lansing policies, with different political environment. | Specific policy | General policy | No policy |
| 7 | Farmington | Has a transmission tower moratorium. | Specific policy | No policy | General policy |
| 8 | Flint | Economic condition difficult. | Specific policy | General policy | No policy |
| 9 | Grand Rapids | Competition in local telephone service. | Specific policy | In process | No policy |
| 10 | Holland | Unique city fiber optic policy. City owns the fiber system. | Specific policy | General policy | General policy |
| 11 | Lansing | Michigan capital. | Specific policy | Specific policy | No policy |
| 12 | Lansing Township | Non-charter township. Examining policy differences in this environment. | Specific policy | General policy | No policy |
| 13 | Livonia | PROTECT member. In the process of getting new ordinances passed | Specific policy | No policy | In Process |
| 14 | Marquette | Largest City in the Upper Peninsula. | Specific policy | General policy | No policy |
| 15 | Negaunee | Smaller Upper Peninsula city for comparison. Municipality owns cable system | No policy | No policy | No policy |
| 16 | Southfield | Protect member. Business hub. Negotiating for new entrants into cable service | Specific policy | General policy | General policy |
| 17 | Sterling Heights | Recently passed new telecommunication ordinances. | Specific policy | No policy | General policy |
| 18 | Troy | PROTEC member. Federal court cases regarding use of public rights of way. | Specific policy | Specific policy | No policy |
| 19 | Wyandotte | Municipal owns cable, electrical, etc. | Specific policy | No policy | No policy |
| | | | Specific : 18<br>No Policy : 1<br>General : 0 | Specific : 3<br>No policy : 7<br>General : 9 | Specific : 0<br>No policy :12<br>General : 7 |

Source: Michigan Business Roundtable, and Collected Ordinances and City Code of Each Communities, updated to April 1997.

Notes

| | |
|---|---|
| Specific policy | : when a community has well-developed written ordinances for any specific telecommunication service. |
| General policy | : when a community has only general written ordinances referring to a telecommunication service but not focusing on any specific service. |
| No policy | : when a community has few or no relevant written ordinances related to any specific telecommunication service. |

Table 2. Cable Ordinance Matrix

| Community | | Franchise fee | Cable Revenue Ratio** | Other charge | Rate Regulation | Franchise Renewal | P-E-G Channels | System/Technology requirement |
|---|---|---|---|---|---|---|---|---|
| 1 | Ann Arbor | 5% | $554,400; 0.75% | 1.1% of annual gross for public access | Basic service, equipment | 15 years | 3 | 550MHz<br>50 channels total |
| 2 | Birmingham | 5% | $71,000; 0.43% | | Basic service, installation | 15 years | 1-3-1 | 54 Channels |
| 3 | Canton Township | 5% | $283,000; 2.30% | 2.0% of annual gross at the first time; 1.0% of annual gross for PEG channels, or $325,000 | Follow FCC rules | 15 years | 1-1-1 | 750 MHz |
| 4 | Dearborn | 3% | $525,000; 0.64% | Initial payment:$3,000 | Basic service;<br>File to City Council | 15 years | | |
| 5 | Detroit | 5% | $3,500,000; 0.28% | | Basic service, equipment;<br>File to City Council | 16 years | | 550 MHz |
| 6 | East Lansing | 5% | $184,000; 0.89% | | Basic service, equipment;<br>Hearing for rate increasing | 12 years | 2-6-1 | 550 MHz |
| 7 | Farmington | 3% | $36,000; 0.65% | Initial $159,000 for PEG channels;<br>2% semiannual payment | Basic service, installation, Outlet | N/A | | 56 channels at beginning;<br>118 channels finally |
| 8 | Flint | 3% | N/A | | File 30 days prior to change | 15 years | 1-1-1 | |
| 9 | Grand Rapids | N/A | $960,000; 1.00% | | Basic service, equipment | N/A | | |
| 10 | Holland* | * | $77,000; 0.48% | | 30 days prior written notices to subscribers | * | | |
| 11 | Lansing | 3% | $326,000; 0.38% | | Basic service, installation;<br>File to City Council | 30years | Follow FCC requirement | |
| 12 | Lansing Township | 3% | $30,000; 1.00% | 2% of annual gross for PEG channels; $100,000 at the first time<br>$10,500 annual for staff of community programming | Basic service,<br>Installation, reinstallation | 15 years | | 40 channels,<br>240 MHz |
| 13 | Livonia | 5% | $860,000; 1.87% | | Basic service | 15 years | 12 channels total | 60 channels, 440 MHz;<br>2 satellite earth stations |
| 14 | Marquette | 5% | $140,000; 1.08% | $20,000 for access programming | Basic service, installation, Outlet | 15 years | 2-1-1 | 54 channels; 324 MHz;<br>6 channels for upstream;<br>3 satellite earth stations |
| 15 | Negaunee* | * | $272,000; 10.57% | | | * | | |
| 16 | Southfield | 5% | $629,000; 1.32% | | | N/A | | |
| 17 | Sterling Heights | 5% | $657,000; 1.18% | 1% of annual gross for community access;<br>$25,000 at the first time | Follow FCC rules | 15 years | 1-2-2 | |
| 18 | Troy | 3% | $493,000; 1.22% | | Basic service | 10 years | | Follow FCC |
| 19 | Wyandotte* | * | $160,000; 1.23% | | Basic service, installation | * | | |

* City owned cable infrastructure.

** Ratio = Cable revenues/General fund revenues*100 in fiscal year.

*** P-E-G: Public Access, Education, and Government channels.

Table 3. Telecommunication Matrix

| Community | | Compensation fee | Other charge | Termination | Other Requirement |
|---|---|---|---|---|---|
| 1 | Ann Arbor | $500 | Late fee: 9% | 10 years | Drops to city, public library, and school buildings |
| 2 | Birmingham | $10,000 or 3% of annual gross revenue | | 10 years plus 5 years | Provide 2 fibers for city's internal use |
| 3 | Canton Township | | | | |
| 4 | Dearborn | 3% of annual gross revenue | | 15 years | |
| 5 | Detroit | | | | |
| 6 | East Lansing | $500 Plus $0.25 per foot | | 12 years | Furnish fibers for city use |
| 7 | Farmington | | | | |
| 8 | Flint | $1.00 per foot | | 30 years | |
| 9 | Grand Rapids | 1% of annual gross revenue,<br>or $0.25 per foot, not less than $1,000 | | 10 years | Customer service and protection |
| 10 | Holland | Lease fee: $640 per month per fiber pair | | 10 years lease | |
| 11 | Lansing | $0.25 per foot, not less than $500 | | 10 years | |
| 12 | Lansing Township | Maintenance fee: $500 | Permit fee: $1,500;<br>Pavement cut fee: $1,250 for each 50 feet | 10 years | No residential video service |
| 13 | Livonia | | | | |
| 14 | Marquette | | | | |
| 15 | Negaunee | | | | |
| 16 | Southfield | | | | |
| 17 | Sterling Heights | | | | |
| 18 | Troy | 5% of annual gross revenue, or $0.4 per foot of underground & $0.25 per foot of overhead. | Franchise formation fee: $10,000 for franchise, $2,000 for license | 15 years | |
| 19 | Wyandotte | | | | |

Table 4 Wireless Telecommunications Matrix

| Community | | Compensation and Charge | Land Use | Location | Safety & Urban Design |
|---|---|---|---|---|---|
| 1 | Birmingham | Monthly rent payment, Special land use: 500;<br>Community impact review fee: $1,500 | Initial term of 5 years,<br>Maximum 25 years lease | | |
| 2 | Detroit | | | Restriction s near airport,<br>Encourage co-location | Black mesh or black perforated metal satellite TV antenna |
| 3 | Farmington | | | Maximum height: 100 feet, or 120 feet (if more than one provider) | Year-around screening<br>Plant materials |
| 4 | Holland | | Expire 5 years | Strongly encourage non-residential area;<br>Encourage joint use 100 feet or more | Security fencing (more than 6 feet),<br>Plant for buffer |
| 5 | Livonia | | | Encourage co-location for a minimum three total users | Located and designed to be harmonious with surrounding areas |
| 6 | Southfield | Initial term annual fee: $7,500<br>Second term annual fee: $8,,700 | Initial term of 5 years,<br>Maximum 25 years lease | Encourage co-location | No hazardous material by law |

# THE DIMENSIONS OF TRUTH :
# THE CASE OF NORTHWEST AIRLINES VERSUS WCCO-TV

Steve LeBeau
1716 Hague Avenue
Saint Paul, Minnesota 55104
(h) 651-646-3034
(w) 651-298-8904
email: lebea002@tc.umn.edu

## Abstract

The Minnesota News Council found that WCCO-TV presented an untruthful account of the general safety of Northwest Airlines in a series of investigative reports during a rating sweeps period. However, there were no significant factual errors in WCCO's reports. This discrepancy can be explained by applying different philosophical theories of truth. WCCO's reports were truthful according to the correspondence theory of truth, but were not truthful according to the coherence and pragmatic theories of truth.

Of all the ethical issues involved in journalism, the ones that require the deepest plunge into philosophical theory are those involving the concept of truth. To find and report the truth is the basis of journalism, and it is the essence of the first guiding principle of the Society of Professional Journalists (Black 1996, p.24). However, it is rare that journalists make any attempt to clarify what they mean by truth (Merrill & Odell 1983, p. 172 ). Truth is a concept that pervades most of the disciplines of philosophy - epistemology, logic, and even metaphysics, in addition to ethics. Truth is an ethical concept in that telling the truth or being honest is a basic moral injunction. Theories of knowledge, or epistemologies, must employ theories of truth in order to explain knowledge, which consists of true beliefs (Quinton, 1967). Truth is also a key concept in logic, in that true premises combined with valid inferences yield true conclusions (Jeffrey, 1967). Truth ultimately involves metaphysical questions because in the final analysis truth requires a grounding in reality.

The purpose of this paper is to begin an exploration of the usefulness of applied theories of truth to clarify ethical issues in journalism. Ralph Potter, who devised a methodological device called the "Potter Box" for applying ethical principles, realized that when moral principles alone cannot resolve an issue, one must move to the "ground of meaning level," and look into the metaphysical or theological underpinnings of a position (Christians, Fackler and Rotzoll, 1995, p. 8). To this can be added epistemological ground.

This paper will examine a case in which the center of the controversy is the nature of truth: WCCO-TV versus Northwest Airlines [NWA]. Both sides agreed that truthfulness is an indispensable value; there is no dispute here over the virtues of truth-telling. The question is whether a television report which centers on accurate statements of fact can, nevertheless, paint a distorted and untruthful picture of reality.

Four theories of truth will be used to examine this case. Three are traditional theories of truth - correspondence, coherence, and pragmatic. A fourth is a non-traditional view - the disclosure theory. It will be found that WCCO's story is true according to the correspondence theory, but not true according to the coherence and pragmatic theories. The disclosure theory will yield mixed results. The application of these theories of truth will follow an exposition of WCCO's reports and the judgment of the Minnesota News Council.

### *Background*

WCCO-TV aired a series of investigative reports about passenger safety at NWA during the May sweeps period in 1996. Based on Federal Aviation Administration reports of safety violations by NWA, WCCO 's highly produced and highly promoted reports linked the safety violations to management pressures on repair crews to get things done quickly - so quickly that mistakes were made, and passenger safety was compromised. WCCO interviewed former and current NWA maintenance workers whose stories formed the basis of WCCO's argument against NWA. Also featured were interviews with two women who had filed sexual harassment complaints against the airline. Their testimony was intended to strengthen the claim that a corporate culture of intimidation threatened all who "rocked the boat," whether they complained to management about sexual harassment *or* about making "safety shortcuts" to get planes ready on time. Although the news anchor reminded viewers that NWA has one of the safest records of any airline, promotions for the sweeps stories asked the question,"Is Northwest compromising your safety?"

NWA and local media outlets immediately attacked the series as overblown. Local newspapers used the same FAA reports along with industry comparisons, which showed NWA to be among the safest airlines in the country (Hanners, 1996). NWA filed a complaint alleging that the series by WCCO was distorted and untruthful, and the case was brought before the Minnesota News Council on October 18, 1996 in Minneapolis. The News Council heard both sides and discussed the issue, before voting 19 to 2 in favor of NWA.

The curious thing about this case is that no one denies that WCCO used accurate statements of fact, and no one claimed that WCCO told lies. The conclusion was that the reports as a whole presented a distorted, untruthful depiction of NWA. During the discussion of the case, members of the News Council focused repeatedly on several areas of concern. The biggest criticism was that WCCO failed to put the safety record of NWA in proper context. One council member, Tom Keller, gave an analogy," It's a little like going in for a checkup and being told you have a cholesterol level of 200, and at that point the doctor walks out. You don't know what it means" (Lambert, 1996b). Several members said they thought the inclusion of the women who had filed suits for sexual harassment was irrelevant to the safety issue. Others mentioned that the overall tone and power of the piece signified serious safety problems at the airline. Member Bob Shaw remarked," As a viewer I was left with the impression that things were radically wrong in the maintenance department at Northwest" (Ibid.).

Commentaries from local journalists followed the same lines of thought. D.J. Tice (1996) of the St. Paul Pioneer Press concluded that WCCO failed "to appreciate the total effect of a story's presentation...(WCCO staff) don't see how a lack of context and an abundance of inflammatory images caused their report to become, in its total effect, 'untruthful' ". A retired editor of the Star Tribune, Wallace Allen,

(1996) gave the News Council a pat on the back, "They came to the right conclusion. They were correct..." The Executive Director of the Minnesota News Council, Gary Gilson, did not vote on the proceedings, but he did cast a vote on the Star Tribune Op-Ed page:

> WCCO said it told the truth, straight from the FAA records. So how could WCCO's litany of facts about Northwest's safety violations, accepted by all parties as true, lead to a distorted, untruthful figure?... WCCO went beyond incontrovertible facts from the FAA reports to build a case that Northwest was placing passengers' lives at risk. No one has to tell lies to produce an untrue picture...How facts are arranged, what is left out, and what is added - these are the components.

WCCO disagrees with the verdict, and continues to maintain that its series was truthful, claiming that the News Council was unqualified to make its judgment (Lambert 1996c). WCCO's News Director Ted Canova challenged a reporter,"The question I have for you is,'What was untruthful about our story?'"(Lambert 1996c) One of the two News Council members who voted in favor of WCCO, Mary Ziegenhagen, said much the same thing, "I thought they hyped it, but I thought they had a true story....I couldn't find any lies in the story"(Gilyard 1996).

On the face of it there appear to be two standards of truth, the one used by WCCO, and the view shared by the News Council. WCCO maintains that it is simply using the industry standard, and a heavy endorsement of that view is that their peers honored WCCO with an Emmy award for their reports about NWA, the day after the denunciation by the News Council (Lambert, 1996c). The standard used by the News Council and subsequent commentators may be referred to either as the common sense view (in a positive sense) or as the conventional wisdom ( in a slightly pejorative sense). The next step is to elucidate the various theories of truth, and apply them to WCCO's series.

### *Theories of Truth*

All of the theories of truth to be considered here have some intuitive basis in common sense. The first three theories, correspondence, coherence and pragmatic, are similar in that they all involve ways to judge statements or thoughts about reality. Truth in this sense is an attribute of an assertion about reality. Sentences are true or false; reality simply*is* . The fourth theory, disclosure, is about reality. However, it is also a theory that is non-traditional in the Anglo-American philosophical tradition. Still, it is not necessarily alien to common sense, and is linked strongly with the journalistic adage of searching for the truth. However, because it is so different from the other three, the discussion of the disclosure theory will follow the application of the first three truth theories to WCCO's reports.

### *The Correspondence Theory of Truth*

Philosophers have argued for thousands of years about the nature of truth without arriving at a definitive answer. But the oldest and most prevalent theory, even today, is the correspondence theory of truth. It goes back at least to Aristotle (1982, p. 399), who declared that truth was a relationship between a statement or a thought and being. A thought was true if it signified something that existed. Seventeenth Century English philosopher, John Locke, (1964, pp. 354-358) also advocated the correspondence theory, and framed the question using terms that are still in use today,"...truth properly belongs only to propositions; whereof there are two sorts, viz. mental and verbal, as there are two sorts of signs commonly made use of, viz. ideas and words." Propositions are the abstract components of thoughts and sentences which signify or carry meaning. The great popularizer of the correspondence theory of truth in the 20th century was Bertrand Russell (Prior, 1967, p. 223ff), who wrote that "truth consists in some form of correspondence between belief and fact."

Many subtle philosophical issues surround the correspondence theory of truth, involving questions concerning the nature of propositions, (e.g. whether they exist), the nature of the relationship between propositions (or beliefs) and reality, and the nature of reality or facts. Much philosophical discussion also revolves on the inadequacy of the correspondence theory of truth to explain falsehoods, as well as its inability to explain logical truths and general truths (Read, 1994). For example, the logical principle of implication cannot be corroborated by any fact existing in the world. One has to look elsewhere to confirm statements about logical truths. Even scientific theories cannot be declared to be valid with a single reference to an existing fact. The correspondence theory is limited to judging simple statements about isolated facts (Kosko, 1993, pp. 83-84).

### *The Coherence Theory of Truth*

The coherence theory of truth, in contrast, is well equipped to handle logical truths. The coherence theory says statements or propositions are true if they fit into a systematic body of known or accepted true statements (Merrill & Odell, 1983, p. 71). The coherence theory of truth has traditionally been associated with two sorts of philosophers, idealists and rationalists like Hegel, Spinoza and Leibniz, and some logical positivists, including Carl G. Hempel and Otto Neurath, although most logical positivists favor the correspondence theory (White, 1967,p. 130). The rationalists believed that all knowledge is logically tied together into a system of absolute truth. If one had clear and distinct ideas about the major truths in the system, one could, through reason alone, deduce all other truths. They believed that each truth logically implied all the other truths, and vice versa.

A different conception of the coherence theory of truth came from the logical positivists, who embraced this theory as a way to account for the nature of the accepted body of scientific truths, rather than of absolute truth. Their notion was that although it may be difficult to verify a scientific hypothesis by direct correlation to the world, it may be *indirectly* supported if it is found to be consistent with other accepted scientific hypotheses. Following in this view is the American analytic philosopher Willard van Orman Quine, who put forth his coherence theory in The Web of Belief (Quine and Ullian, 1970)

In recent years the coherence theory of truth is seeing a revival of sorts, due to the influence of certain postmodern European thinkers. A common presupposition in postmodern thought is the dominant role of context in determining the meaning of discourse. (Jensen, 1991 p.17-43) Since meaning must be ascertained before a truth value can be applied, the context also determines the truth of a statement. Even critics of the coherence theory of truth admit the importance of context. Philosopher Lawrence E. Johnson, an advocate of a revised correspondence theory, admits, "it is worth bearing in mind, as the coherentists stress, that truths do not exist on their own as independent and isolated units." (Johnson, 1992 p.15)

One consequence of the coherence theory is that, since meaning varies depending on the context, the truth value of a sentence varies. This sort of truth could obviously not always obtain certain verification, and so the believers in the coherence theory accept *degrees* of truth (White, 1967, p. 130).

From a common sense perspective, something like a coherence theory would be needed to evaluate statements about the past and future, since these statements cannot be said to correspond directly to reality in the here and now. If you could not examine facts to verify a statement, you could at least find out if a statement about the past fits in with everything else we know about the past. The coherence theory also has utility in journalism. If a reporter is given a piece of information, but no way to confirm it (at least not by deadline), then the reporter could at least attempt an indirect verification by finding out if it is consistent with available facts (Merrill & Odell, 1983, p. 72). The coherence theory has the advantage that it makes clear that everything is interrelated. Its disadvantage is that it may accept some things as true which turn out to be false.

### The Pragmatic Theory of Truth

The pragmatic theory of truth is at once the most likable and the most controversial of the traditional theories of truth. As developed by American philosopher William James (1948, pp.159-176), the pragmatic approach asks about the "cash value" of a statement in experiential terms. That is, a true statement must be able to make some sort of difference in terms of one's future experience. If it works it is true. This formula for verification is quite similar to the verifiability theorem of logical positivism, which says that a statement has no meaning unless it can be empirically verified. The logical positivists used this to get rid of all discussions of metaphysics, such as talk about God and spirits, and even the mind. Unfortunately, James took it to the opposite extreme. He said that there may be some degree of pragmatic truth to a belief, such as a belief in God or some other deity, even if there were no factual truth to the matter (Merrill & Odell, 1983, p. 73). His rationale is that such beliefs may have a beneficial influence on our behavior and state of mind, and so if it works, it must be true. However well intended his moral sentiment, this line of reasoning drove all the major pragmatist philosophers away from the theory.

Still, James makes some points that converge with common sense. He maintains that pragmatic truth is always tentative, so that some future experience may prove it false. This is the way that people actually have to live their lives. Nothing is ever really proven to be true once and for all. This also harks back to the original meaning of the word 'truth', which some etymologists trace to the Indo-European base **dru*, which means 'wood' or 'tree', and is where we get the English word 'tree'(Ayto. 1990, p. 543). The relevant connotation here is the "steadfastness" of strong trees such as oaks. The point is that the pre-philosophical meaning of truth is something which is more or less reliable. The notion of absolute truth or certainty can be seen as a philosophical invention, and not a practical tool. In a journalistic context, pragmatic truth is "news you can use."

### *The Application of the Correspondence Theory*

The application of the correspondence theory of truth to WCCO's position is quite straightforward. WCCO summarized its main points in its position statement to the News Council:

> 1) A $725,000 fined levied by the Federal Aviation Administration for safety violations, over a period of years, which compromised passenger safety
>
> 2) Employees who said they felt pressure to get out planes "on time" and believed this pressure caused them and other employees to make inadequate repairs in some cases
>
> 3) Employees said they feared retaliation for reporting maintenance problems

There was no challenge by NWA of the facts referred to in the first point, which concerns the FAA investigation. It is a true statement because it refer to facts. The second and third statements here are quite easily proven true, because they merely say that "employees said". These employees did indeed say these things; their comments were part of the newscasts. Therefore statements two and three refer to facts, and are true statements according to the correspondence theory of truth. it should be added that the members of the News Council did not question the truth of the assertions of these employees (although Northwest certainly did). Given the benefit of the doubt, we can say that WCCO did tell the truth in its newscasts, when judged by the correspondence theory of truth.

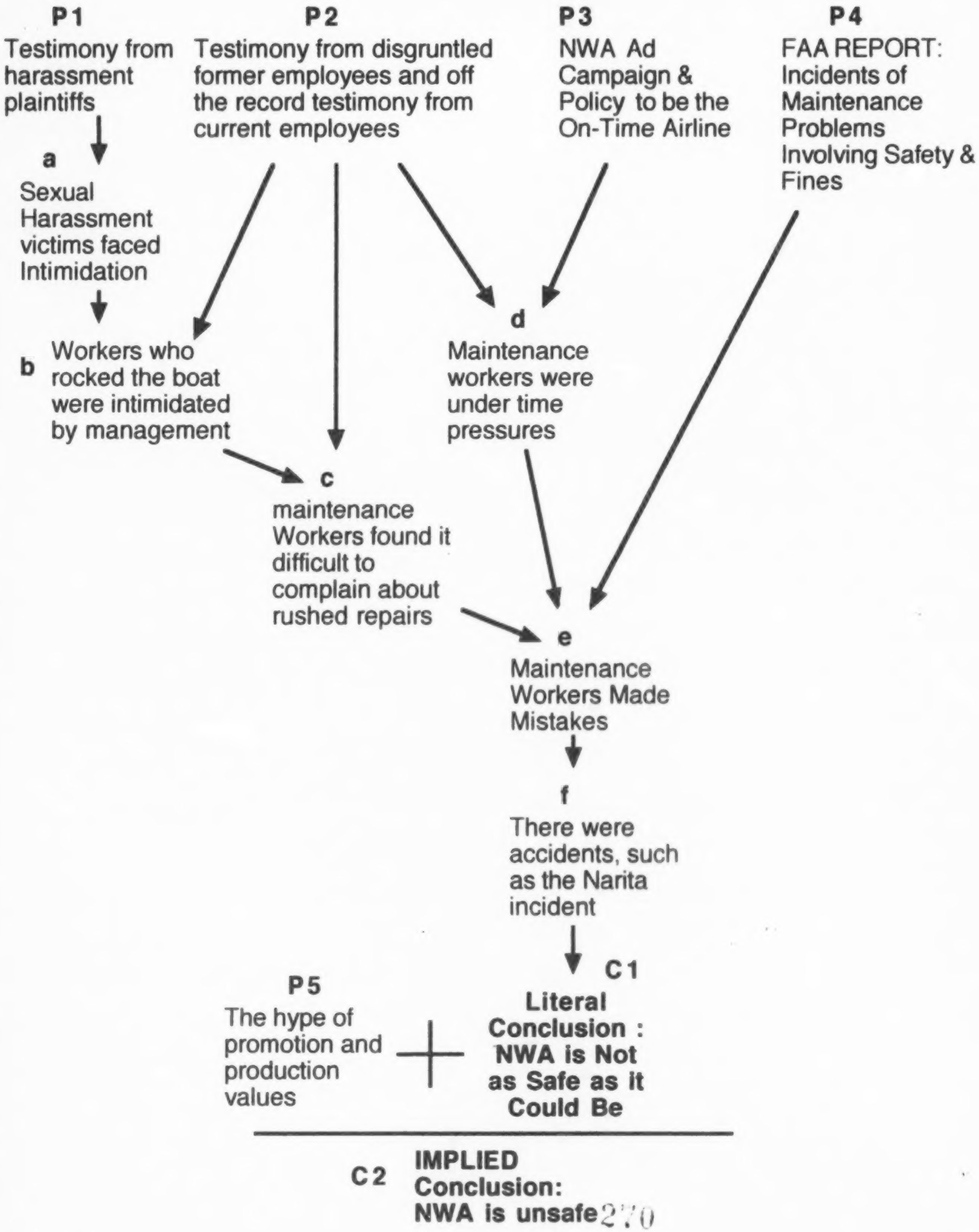
### *The Application of the Coherence Theory*

The application of the coherence theory of truth is relatively complicated. According to the coherence theory of truth, it must be made clear how the facts stated by WCCO cohere with each other, and how facts not stated by WCCO relate. Further, it must also be made clear how the presentation of the newscast relates to the viewer.

The first step is to show the logical relations among the facts presented in WCCO's reports. They can be shown to form an argument such as that presented in Figure 1, The Logic of WCCO's Case Against NWA (next page). The items on the chart are based on WCCO's statement to the Minnesota News Council and based on WCCO's televised reports.

As Gary Gilson said, WCCO did more than just present a litany of facts. WCCO was out make two points - a conclusion, that NWA could be safer, and an explanation of why NWA is not as safe as it could be. The diagram is constructed showing WCCO's sources of information on the top row. To bolster its argument that employees feared retaliation by management, WCCO interviewed several women (**P1**) who had filed sexual harassment suits against their former employer. These women agreed that they were intimidated (**a**). Intermediate conclusion (**a**) was combined with testimony from former and current NWA repair workers (**P2**) to lead to intermediate conclusion (**b**), that workers who rocked the boat were intimidated by management. This atmosphere of intimidation (**b**) combined with further testimony of employees (**P2**) leads to intermediate conclusion (**c**), that maintenance workers found it difficult to complain about rushed repairs. It is common knowledge that NWA had an ad campaign and a policy to be the "On Time Airline", so that fact (**P3**) combined with testimony from employees (**P2**) to support the intermediate conclusion (**d**), that repair workers were under time

**Figure 1: THE LOGIC OF WCCO'S CASE AGAINST NWA**


P1
Testimony from harassment plaintiffs
a
Sexual Harassment victims faced Intimidation
b
Workers who rocked the boat were intimidated by management
P2
Testimony from disgruntled former employees and off the record testimony from current employees
c
maintenance Workers found it difficult to complain about rushed repairs
P3
NWA Ad Campaign & Policy to be the On-Time Airline
d
Maintenance workers were under time pressures
P4
FAA REPORT: Incidents of Maintenance Problems Involving Safety & Fines
e
Maintenance Workers Made Mistakes
f
There were accidents, such as the Narita incident
C1
Literal Conclusion : NWA is Not as Safe as it Could Be
P5
The hype of promotion and production values
+
C2
IMPLIED Conclusion: NWA is unsafe

pressures. This pressure (**d**) plus the difficulty workers faced when complaining about rushed repairs (**c**) explained why workers sometimes made mistakes (**e**), a fact already supported by the FAA (**P4**). These mistakes by workers (**e**) explain why accidents occurred (**f**) such as the accident at Narita airport, where an engine fell off a plane because the bolts to attach it were left on a workbench in Minneapolis. These incidents (**f**) prove the conclusion (**C1**) that NWA is not as safe as it could be.

The logic of WCCO's case makes it clear that the testimony of the sexual harassment plaintiffs was not irrelevant. The diagram shows how that testimony (**P1**) helps to support the claim, also made by the maintenance workers (**P2**), that workers who rocked the boat were intimidated by management (**b**).

The formulation of the literal conclusion (**C1**) is a quote from WCCO anchor Don Shelby made during a promotional appearance on a WCCO program, *Moore is Less* . This is the weakest literal conclusion that can be made, and thus the easiest to support. One suspects that it is always true that an airline could be safer than it is. Thus the literal conclusion could be true but trivial. The stronger the conclusion, the more difficult it is to support.

An alternative formulation would be (**C1'**), Northwest compromises passenger safety. This claim, however, still receives strong support from the evidence in the FAA report alone (**P4**). But the problem is that the ambiguity of (**C1'**) is wide ranging. It could mean that NWA compromised passenger safety in the past, but is no longer doing so. In that case, the FAA report (**P4**) still provides adequate justification. But if the conclusion was strengthened to read, "NWA is *currently* compromising passenger safety", then more evidence is needed, such as the testimony about hostile and pressured working conditions from NWA employees (**P2**) and (**P1**). If this testimony is true, then it follows that NWA is currently compromising safety. This would be the strongest literal conclusion stated by WCCO, but it does not mean that it was the conclusion as perceived by viewers.

The coherence theory of truth suggests that the truth value of a statement changes depending on the context, and one part of that context is the relation between the story and the audience. The News Council members and media commentators mentioned that their perception of the overall conclusion is that safety concerns at NWA were serious. The reason they thought this, presumably, is because of the hype of the story in both production values and promotions. If so much time, effort and money is poured into a story, not to mention the dramatic tone, then the natural response is to expect some very important conclusion. The effect of playing up the story is to exaggerate the conclusion, which Kahane (1976, p. 185) cites as a standard device that leads to distortion in the news. Accordingly, all the hype attached to the story (**P5**), combined with a weak conclusion about airline safety (**C1**) or (**C1'**) leads to a much stronger *implied* conclusion (**C2**) that NWA is unsafe.

The way the high production values heightened the impact of the story helps to explain the truth gap between WCCO and the News Council. But if such heavy hype has become the industry standard for sweeps period stories, shouldn't sophisticated viewers simply dismiss it *as* hype and not take the story so seriously? The question of how seriously to take the conclusion also demands context. And that is precisely what the News Council members asked for - context (Lambert, 1996b). Several members suggested that WCCO should have used a simple chart showing the relative safety records for the various airlines. This would have provided a strong visual clue to the audience that NWA is not quite so unsafe as it might seem. WCCO chose to avoid comparisons, and it was when the daily newspapers published them that people learned that NWA's safety problems weren't *that* serious. That's when it became credible to dismiss WCCO's report as distorted and untruthful. Merrill (Merrill & Odell, 1983, pp. 173-174) writes that reported truth and perceived truth occupy different levels of truth, but "the real truth in the story is what each individual reader concludes or perceives to be the truth of the story." In that case, WCCO cannot argue that viewers or news council members are "unqualified" to make judgments about tone and perception (Lambert, 1996c).

The coherence theory of truth has guided a view of WCCO's report in terms of its internal logical relations, its connection to hyped production values, its relation to the viewer and its broader context with other knowledge. All of these connections yield an implied conclusion that NWA is seriously unsafe, a conclusion that is found to be false when compared to a wider range of facts about the safety records of the different major airlines. Kahane (1976, p. 45) would label WCCO's argument as "valid yet fallacious" because it uses true statements in a valid way, yet arrives at a false conclusion. The perceived conclusion does not fit into to the rest of reality.

### *Application of the Pragmatic Theory*

The pragmatic theory of truth comes in the form of a question: if your statement is true, what difference will it make in my future experience? (James, 1949, p. 160). If the assertion is that NWA is unsafe, then one should expect to see a lot of accidents and plane crashes. If the WCCO report was offered as "news you can use", then the pragmatic meaning would be to find another airline. It seems that WCCO anticipated this response, and so the day after its first report on NWA's safety problem, it featured a story on the impact of the news on fliers. Oddly enough, they found no evidence that anyone had canceled a flight on NWA. Apparently no one used this news. Also, if one accepted only a weakened conclusion, that NWA could be safer, then probably no pragmatic response would register. But it should be remembered, pragmatic truths could suddenly be reversed; it is possible that one may experience an accident aboard a NWA jet. It is just that WCCO has not sufficiently justified any great change in one's flying behavior.

273

It should be pointed out that the pragmatic theory of truth is open to perverse applications. For example, a TV station could say that a story "works" by getting good ratings, and so any story that succeeded in getting a big audience is true. As farfetched as this may sound, it could nonetheless serve as a fitting description for the behavior of many TV stations around the country during sweeps periods (Ehrlich, 1995, pp. 37-47).

### *Preliminary Summary*

The application of three truth theories to the case of WCCO vs. NWA shows that both sides have some claim to truthfulness. In a simple application of the correspondence theory, WCCO was truthful insofar as its statements corresponded to facts. However, the deficiencies in WCCO's reports as clarified by the coherence theory reveal serious distortions and "runaway" conclusions. The verdict of the coherence theory strongly parallels the views of the news council members and media commentators that judged WCCO's stories to be untruthful. The pragmatic theory of truth found that WCCO presented little in the way of usable truth.

Which theory should be believed? Philosophers tend to choose one theory and argue against the other two (Merrill & Odell, 1983, pp. 70-74) . Each theory has its own metaphysical presuppositions, and this influences their use. For example, Gans (1979, p.184) suggests that journalists are "the last remaining bastion of logical positivists in America", and Iggers (1993, p. 135ff) argues that this coincides with a "naive realism" and a belief in objectivity which predisposes journalists to rely upon the correspondence theory of truth. This means that journalists tend to believe that objective facts are there in the world, and all they do is report them. Such simple notions of objective realism in philosophy more or less disappeared about two hundred years ago with the work of Immanuel Kant, who argued that the concepts we have determine what we perceive (Kant, 1969). There is an increasing recognition that the perception of facts is an act of interpretation, even when it comes to reporting news (Tuchman, 1978).

Rather than select a single theory, the most prudent method may be to use all three theories to examine cases in which truth is the central issue. Each of these theories has flaws, but each also has strengths, and intuitive connections with common sense. Furthermore, there is a philosophical tradition which combines all three, the Nyaya-Vaisheshika system of ancient India (Encyclopedia Brittanica On-Line, 1996). Nyaya-Vaisheshika, a form of pragmatic realism (Potter, 1963), is a Hinduistic philosophy known for its highly developed form of logical inference. The Nyaya-Vaisheshika inference schema is similar to Aristotle's syllogism, except it requires an example to be listed as a premise that is similar to what one is attempting to prove (Rhadhakrishnan and Moore, 1971, pp. 356-357). In this way, context is built into the syllogism, so that in debates opponents cannot try to argue for absurd or unreal conclusions. In the case of WCCO, the Nyaya-Vaisheshika would require as part of its argument an example of what it meant by an unsafe airline.

### The Disclosure Theory of Truth

The final theory of truth to be considered in this paper stands out from the other three in that it does not set out criteria by which to judge statements as true or false. The disclosure theory of truth concerns the *nature* of truth, not the verification of propositions (Gelven, 1970, p. 129). Twentieth century German philosopher Martin Heidegger (1962, pp.256-273) puts forth the disclosure theory of truth not as an alternative to Aristotle's correspondence theory, but as a way to explain it. Heidegger examines truth as part of his investigation into the meaning of Being. His discussion of truth turns on the ancient Greek word for truth, *aletheia,* which literally means 'un-hiddeness'. The connotation is that obtaining truth is an activity whereby the person discloses something, and that which is disclosed becomes unhidden. This ties in closely with the journalistic notion of searching for the truth through investigative reporting. Investigative reporters are not searching for true propositions, they are seeking to disclose that which is hidden.

This means in part to go beyond the mere fact of the matter. Lippman, for one, makes a distinction between facts and the truth (1949, pp. 226-227). He says to report that Smith went bankrupt is to report a fact; to explore *why* he went bankrupt is to search for the truth. Lippman warns that once a journalist goes beyond the surface facts, "all standards disappear...There is no discipline in applied psychology, as there is a discipline in medicine, engineering or even law, which has authority to direct the journalist's mind when he passes from the news to the vague realm of truth"(Lippman, 1949, p. 227). While this may be a difficult undertaking, it is part of the important work of journalism. Olen (1988, p.83) puts it this way, "...to *know* what happened is to know the facts, but to *understand* what happened is to grasp the truth (italics his)." This is what WCCO attempted to do with the FAA report on NWA. WCCO's investigative unit wanted to find out the explanation of why those safety violations had occurred. And so their investigative unit, the I-Team, entered the "vague realm of truth."

To its credit, WCCO and most news organizations realize that truth is not there for the taking, it must be disclosed. But Heidegger adds that people not only have the power to reveal truth, but also the power to conceal it (1962, p. 268). The vague realm of truth needs clarity of thought to accurately arrive at cogent explanations of events. Beware of the intoxicant that comes four times a year under the guise of ratings sweeps. Several writers in the field of journalistic ethics have discussed the ethical dilemma of sweeps (Erlich, 1995, pp. 37-47). The dilemma is that because news stations give more time and money to stories for sweeps periods, journalists have a better chance to dig deep and create substantial reports that really get at the truth. But there also is the tendency to simply go for the numbers, and sensationalize. Unfortunately, it appears that WCCO did both in its sweep stories on Northwest Airlines. They dug up the truth behind certain safety violations, but they also hyped up the story so much that, in the judgment of the Minnesota News Council, they ended up with untruth.

### *Conclusion*

The application of philosophical theories of truth helped to clarify the case of WCCO versus NWA. The correspondence theory provided a perspective from which it could be claimed that WCCO told the truth. The coherence theory gave structure to the News Councils common sense criticisms of WCCO's reports, and explained how the series could be seen as untruthful. The application of the pragmatic theory showed that WCCO's report was not news you can use. The disclosure theory gives form to the journalistic impetus to search and report the truth. The combined application of theories helps to clarify the ethical issues in question. Based on this result, further exploration of applied truth theories to journalistic issues is warranted. Such studies should seek to clarify the metaphysical presuppositions involved in each truth theory, and should explore the possibility of a combined application, as in the case of the nyaya-vaisheshika system of India.

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Running Head: Unique Nature of Communications Regulation

# The Unique Nature of Communications Regulation: Evidence and Implications for Communications Policy Analysis

Philip M. Napoli

Assistant Professor

Rutgers University

School of Communication, Information, and Library Studies

Department of Communication

4 Huntington St.

New Brunswick, NJ 08901

philipn@scils.rutgers.edu

732-932-8569

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# The Unique Nature of Communications Regulation: Evidence and Implications for Communications Policy Analysis

## Abstract

The numerous policy changes taking place following the passage of the Telecommunications Act of 1996 necessitate an examination of the nature of communications regulation. Specifically, it is necessary to determine whether the prevailing analytical perspective adequately accounts for the fundamental differences between communications regulation and the regulation of other industries. This paper outlines these fundamental differences and offers recommendations for how these differences can be better accounted for in the analysis of communications policies.

# The Unique Nature of Communications Regulation: Evidence and Implications for Communications Policy Analysis

## Introduction

The numerous communications policy changes taking place following the passage of the Telecommunications Act of 1996 necessitate a thorough examination of the nature of communications regulation. Specifically, it is necessary to determine whether the prevailing analytical perspective producing these decisions sufficiently accounts for the fundamental differences between communications regulation and the regulation of other industries.

The first section of this paper outlines these fundamental differences, through an examination of various policy decisions and institutional analyses of the Federal Communications Commission. This section also illustrates how these points of distinction pose important challenges for communications policy analysis. The second section draws upon individual cases to demonstrate that policymakers often fail to sufficiently account for these differences in their analytical processes. Consequently, policy decisions emerge from what is described here as an "analytical asymmetry." The final section outlines recommendations for developing a more symmetrical approach to communications policy analysis.

## The Unique Nature of Communications Regulation

The fundamental differences between communications regulation and the regulation of other industries pose unique challenges to communications policy analysis. The key differences discussed in this section are: (a) the unique potential social and political impact of FCC policy decisions; (b) the ambiguity surrounding the FCC's classification as an economic or a social regulatory agency; and (c) the potential overlap and interaction between economic and social concerns within individual policy decisions.

## The Potential Social and Political Impact of FCC Decisions

The FCC is unique among regulatory agencies in the extent of its ability--and authority--to make decisions that can directly affect political and social beliefs and values that are central to the democratic process. This is because the industries the FCC regulates have a unique capacity for social and political influence.[1] Researchers have found evidence that the communications industries are capable of a variety of effects, including setting the public's political agenda (McCombs & Shaw, 1972), affecting political knowledge and political participation (Graber, 1984; Patterson, 1980), and even contributing to criminal and violent behavior (Comstock, et al., 1978; Surgeon General's Scientific Advisory Committee on Television and Social Behavior, 1972). Journalism's common identification as the fourth branch of government alone provides a strong indication of the communications industry's unique influence potential, particularly in relation to other regulated industries.

Other regulatory agencies share the FCC's authority to impose regulations on speech. For example, the Securities and Exchange Commission restricts the sharing of information regarding stock transactions and the Federal Trade Commission restricts deceptive advertising (see Sunstein, 1993, p. 33). However, unlike the FCC, the type of speech regulated by these agencies has little potential to affect those political and social attitudes and beliefs that are central to the democratic process. Consider, for instance, a Commission policy such as the Fairness Doctrine, which required broadcasters to provide contrasting viewpoints on controversial issues of public importance (Federal Communications Commission, 1949). The FCC eventually concluded that the policy had a "chilling effect" on broadcasters (Federal Communications Commission, 1985;

Syracuse Peace Council v. Federal Communications Commission, 1989). According to the Commission, the burden of meeting Fairness Doctrine requirements compelled broadcasters to present fewer discussions of controversial public issues. If the policy did indeed have such an effect, then there was a potential ripple effect all the way to the political knowledge, public opinion, and voting behavior of the television audience, which was now receiving less information regarding controversial public issues than before. This information flow is fundamental to the formation of the social and political views that guide political behavior (Entman, 1989, p. 26).

Or, consider less content-directed regulation, such as ownership restrictions. Historically, the FCC and Congress have been concerned with limiting ownership concentration within local markets, as well as nationally (Federal Communications Commission, 1964; Federal Communications Commission, 1970; Telecommunications Act, 1996). Given the evidence indicating that greater concentration of ownership may produce greater homogeneity of content and less diversity of political and social viewpoints (Gormley, 1976; Pratte and Whiting, 1986), policies designed to affect ownership concentration may also affect the information that influences social and political attitudes and behavior (see Stempel, 1973). As this example illustrates, even structural regulations are capable of affecting the nature and flow of information. Consequently, making clear distinctions between content and non-content-directed regulations may not be possible, or, at the very least, such distinctions may not be very meaningful (Bhagwat, 1995; Sullivan, 1995; Sunstein, 1993).[2]

Those within government have long operated from an understanding of the communications industry's unique potential for social and political influence. Congress' recognition of broadcasting's unique influence potential was a key factor behind the initial decision to impose government regulation (McChesney, 1994), as well as later decisions about the exact structure of the new regulatory system (Hazlett, 1990, 1997; Shipan, 1997). Both executive and legislative branch analyses of regulatory agencies have frequently made special considerations for the FCC, due again to the communications industry's influence potential (see Napoli, in press). For example, the first Hoover Commission report, which presented the results of exhaustive analyses of each of the major independent regulatory commissions, was highly critical of the commission form in general, yet it explicitly praised its utility for communications regulation. Within the context of communications regulation, the Hoover Commission concluded that "There is no satisfactory substitute for collegial action" (Golub, 1948, p. IV4-IV5). Similarly, the President's Advisory Council on Executive Organization (1971), in its report to President Lyndon Johnson, advocated the abolition of the commission form for most regulatory agencies. However, the Advisory Council made an exception for the FCC:

> To an extent not present in other agencies, regulation in this area involves personal value judgments as to the type, quality, and substance of programming--the product of the industry which the FCC oversees. . . . The mere appearance of possible undue influence over program content might undermine public confidence in the sources of its information. Thus, we believe it would be inadvisable to place in the hands of a single administrator the power to exercise control over industry members through licensing and programming decisions. (p. 25)

In this statement we again see an illustration of how the FCC can affect the nature and flow of information both directly (i.e. via program content regulation) and indirectly (i.e. via licensing decisions).

For communications policy analyses, the unique influence potential of communications policy decisions introduces a range of "externalities" that seldom needs to be addressed within traditional policy contexts. Externalities can be thought of as the indirect consequences (either positive or negative) that arise from policy decisions. Within communications regulation, these externalities extend into areas that most policy analysts may seldom take into consideration, or may not know how to identify and measure (see Entman & Wildman, 1992, pp. 13-15; Hamilton, 1996; Sullivan, 1995). For example, comprehensively analyzing the effects of the Fairness Doctrine clearly necessitates looking at its possible effects on citizen knowledge and voting behavior. Similarly, a complete analysis of the externalities of ownership regulations necessitates investigating possible changes in media content and public opinion. In sum, because of the potential for communications policy decisions to indirectly affect the political and social disposition of the public, communications policy analysts face a more complex analytical burden than analysts in other policy areas (see Hamilton, 1996; Sullivan, 1995, p. 960). The range of variables and methods that must be considered extends into areas seldom encountered within other regulatory contexts.

## The FCC as an Economic and Social Regulator

Communications regulation is further differentiated from the regulation of other industries by the ambiguity surrounding its proper classification as either economic or social regulation. Analyses of the regulatory process have frequently categorized regulatory activities as either "economic" regulation or "social" regulation (Kahn, 1988; Reagan, 1987). The rationale for economic regulation can involve "market failure" issues such as natural monopoly, inadequate information, and externalities (Reagan, 1987, p. 36; see also Kahn, 1988). Social regulation can be distinguished from economic regulation by its concern for the physical, moral, or aesthetic well-being of the population, as opposed to its economic well-being (Reagan, 1987, p. 86). Regulation directed at such issues typically involves greater degrees of subjective judgment on the part of the regulators than does purely economic regulation (Kahn, 1988, p. 181). Characteristic social regulation agencies include the Occupational Safety and Health Administration, the Food and Drug Administration, and the Environmental Protection Agency (Reagan, 1987).

However, unlike these regulatory agencies, the FCC remains difficult to classify as either a purely economic or purely social regulatory agency. Its regulatory authority extends into both areas. For example, decisions involving common carrier access charges are best classified as economic regulation, given their overriding concern for increasing competition and breaking down long-standing monopolies. In contrast, the Commission's regulations regarding broadcast indecency are easily classified as social regulation, given their concern for protecting the public from harmful or offensive content. (Of course, the distinction between the two areas is not always clear.)

Analysts of government regulation have grappled with the appropriate classification of the FCC. For example, in his extensive discussion of the points of distinction between economic and social regulation, Reagan (1987) at one point categorizes the FCC as an economic regulatory agency, citing examples such as the regulation of presumed natural monopolies like cable television and the allocation of broadcast frequencies. However, his later examples of social regulation include the FCC's enforcement of the Fairness Doctrine. Given this apparent contradiction, Reagan (1987) is ultimately forced to characterize the Commission as an example of "mixed economic and social regulation" (p. 88).

The divergent interpretations of the Commission's ambiguous "public interest" mandate (Communications Act, 1934) further illustrate the FCC's status as a "mixed" regulatory agency. Conflicting perspectives within the Commission over the interpretation and application of the "public interest" standard have been commonplace over the years (Faulhaber, 1987, p. 41; Streeter, 1996, p. 161; Webster & Phalen, 1995). The well-known Fowler-Minow dichotomy illustrates how these interpretations have spanned the economic-social continuum (see also Brennan, 1992). According to Reagan-era Chairman Mark Fowler's well-known "marketplace approach":

> Communications policy should be directed toward maximizing the services the public desires. Instead of defining public demand and specifying categories of programming to serve this demand, the Commission should rely on the broadcasters' ability to determine the wants of their audiences through the normal mechanisms of the marketplace. The public's interest, then, defines the public interest. (Fowler & Brenner, 1982, pp. 3-4)

In contrast, Newton Minow's "trusteeship model" emphasizes the imposition and enforcement of social welfare obligations by the FCC. According to this perspective, audience preferences and market forces alone do not determine the nature of media content and services, and are not assumed to lead to the fulfillment of social welfare objectives (see Minow & LaMay, 1995). As Minow (1978) told broadcasters, "your obligations are not satisfied if you look only to popularity as a test of what to broadcast" (p. 212).

Of course, some argue that the marketplace approach to communications regulation is just as effective--if not more so--at achieving social values goals as the trustee model (e.g. Cronauer, 1994), though this assumption has come under frequent criticism (Bhagwat, 1995; Hagelin &

Wimmer, 1986; Sunstein, 1993). Regardless, the Fowler-Minow dichotomy still reflects different perspectives on whether the FCC is primarily an economic or primarily a social regulatory agency.[3] This ongoing debate over the true scope of the FCC's authority, and the fact that individual commissioners can seize on one dimension or the other in their regulatory perspective, indicate the degree to which both economic and social dimensions are central to the Commission's responsibilities. Neither a purely economic or purely social welfare perspective alone captures the extent of the FCC's regulatory responsibilities.

Other regulatory agencies, such as the Environmental Protection Agency or the Federal Trade Commission, may have the potential to make regulations that have both an economic and a social or political impact; however, their overriding objectives remain much more unidimensional. Consider the FTC's mission statement: "... to ensure that the nation's markets function competitively, are vigorous, efficient, and free of undue restrictions. . . . to enhance the smooth operation of the marketplace" (Federal Trade Commission, 1998), or that of the EPA: "...to protect human health and to safeguard the natural environment" (Environmental Protection Agency, 1998). Compare these to the FCC's mission statement: "...to encourage competition in all communications markets and to protect the public interest" (Federal Communications Commission, 1998a). These mission statements clearly indicate the greater duality of the FCC's responsibilities, as the separation of competition and the public interest in the FCC's mission statement clearly suggests that economic objectives and the more ambiguous public interest objectives are not necessarily congruent.

Given the FCC's "mixed" regulatory status, a unidimensional analytical orientation is clearly insufficient for effective communications policy analysis. The common tendency to analyze policies either from a strict economic or strict social values perspective (Entman & Wildman, 1992) reflects a dangerously myopic conception of the FCC's regulatory role and responsibilities. Such one-dimensional approaches are thus likely to lead to sub-optimal decision making. Consequently, communications policy analysts and decision makers must possess a unique degree of analytical and methodological flexibility in order to accurately reflect the "mixed" nature of the Commission's regulatory authority.

## The "Mixed" Nature of Individual Policy Decisions

Not only do the FCC's responsibilities extend across both economic and social regulation, but individual regulatory decisions often involve both economic and social values objectives. Thus, while the previous section was concerned with the scope of the FCC's regulatory authority and the subsequent implications for policy design and analysis, this section addresses the more narrow issue of the overlap and intersection of economic and social welfare objectives within individual decisions. Consider, for example, cable rate regulation. On the one hand, these regulations can be seen as efforts to protect consumers from monopolists attempting to charge inflated prices for their products. On the other hand, cable rate regulation represents a social welfare-motivated effort to preserve and enhance information access to a wide spectrum of the population, and to prevent further divisions between the "information rich" and the "information poor" (e.g. Aufderheide, 1992).

Ownership regulations are of a similar character. They are intended to preserve competition, and the economic benefits (lower prices, more innovation, better service) that often arise from competition, yet they have also frequently been linked with social and political concerns about the effects of media concentration on the free flow of ideas and the availability of diverse viewpoints (Bagdikian, 1997; Baseman & Owen, 1982; Herman & Chomsky, 1988). As the Court of Appeals of the District of Columbia Circuit stated in Hale v. FCC (1970), "it is . . . becoming increasingly obvious that application of antitrust doctrines in regulating the mass media is not solely a question of sound economic policy; it is also an important means of achieving the goals posited by the First Amendment" (p. 561).

These intersections of economic and social values objectives impose further challenges to communications policy analysis. The first key challenge involves adequately assessing a policy's performance across economic and social values criteria, given that a single policy's objectives frequently extend into both areas. It is also vital to sufficiently account for possible interactions between economic and social dimensions. Policymakers clearly need to avoid making decisions that achieve one set of objectives while simultaneously undermining others. The key questions that need to be investigated to minimize such occurrences include: Does enhancing competition positively or negatively affect diversity? How does enhancing localism affect competition and diversity? How will competition affect universal service? The intersection of economic and social values objectives within individual decisions requires the thorough and rigorous investigation of such questions for effective communications policy analysis. The nature of these questions reinforces the need for communications policy analysts to be adept in the techniques and methods of both economic and social welfare analyses and, most importantly, to be able to integrate the two approaches.

## Evidence of Failure to Account for the Unique Nature of Communications Regulation

Thus far, this article has argued that communications regulation possesses fundamental differences from the regulation of other industries, and that these differences pose important challenges for communications policy analysis. As this section will demonstrate, policymakers frequently neglect these differences, resulting in substantial empirical and logical gaps in decision making. These gaps are largely due to an analytical orientation that consistently fails to investigate and account for the social and political consequences of policy decisions with the same empirical rigor as the economic consequences (see also Brennan, 1992). This analytical asymmetry neglects key social and political externalities of communications policy decisions, and fails to acknowledge the intersection between economic and social values regulation that characterizes both the FCC as a policymaking institution and individual policy decisions.

Communications policymaking has been plagued with instances of the FCC failing to conduct sufficient empirical investigation into the non-economic effects of policies (see Lavey, 1993; Simon, Atwater, & Alexander, 1988). For example, Hagelin and Wimmer (1986) illustrate how the FCC failed to investigate empirically the effects of eliminating program log requirements on the flow of information to the public, though the Commission did conduct substantial empirical analysis of the financial effects of the program log requirements on broadcasters. In eliminating the Fairness Doctrine, the Commission cited factors it believed contributed to a "significant danger" of a chilling effect (Federal Communications Commission, 1985, p. 169), when the existence of such an effect could easily have been subjected to empirical investigation--and in fact has been by academic researchers (e.g. Hazlett & Sosa, 1997).[4] Instead, the primary empirical guidance for the decision came in the form of evidence that competition in the media marketplace had increased (Federal Communications Commission, 1985, pp. 208-217).

The FCC's policy requiring integration of broadcast station ownership and management was intended to increase licensee sensitivity to local community needs (Bechtel v. Federal

Communications Commission, 1993). However, the Circuit Court of Appeals for the DC Circuit struck down the rule, concluding that "the Commission [has] accumulated no evidence to indicate that [the policy] achieves even one of the benefits that the Commission attributes to it" (Bechtel v. Federal Communications Commission, 1993, p. 880). Similarly, the Commission has operated under the assumption that increased source diversity naturally leads to increased content diversity, but has developed no empirical support for this assumption (see Napoli, 1997b). This empirical vacuum led to the D.C. Circuit's rejection of the Commission's gender preference in broadcast licensing (Lamprecht v. Federal Communications Commission, 1992) and contributed to that court's recent rejection of the FCC's EEO hiring rules (Lutheran Church-Missouri Synod v. Federal Communications Commission, 1998). These rules, which encouraged broadcast stations to have a personnel mix that reflected the ethnic diversity of their market area, were intended to enhance program diversity. However, the court rejected the rules partly on the basis of the Commission's failure to provide evidence linking personnel composition with program content (Lutheran Church-Missouri Synod v. Federal Communications Commission, 1998).

A key facet of this analytical asymmetry is policymakers' consistent failure to empirically examine the interaction between economic and non-economic variables. That is, there has been a general tendency to neglect how policies designed to increase competition or efficiency affect non-economic policy concerns, and vice versa. For instance, the objectives of the "must-carry" policy[5] were both economic (to prevent anti-competitive practices among cable operators) and social (to enhance diversity and localism). The policy was challenged by cable operators but upheld by the Supreme Court. In her dissent, Justice O'Connor accurately pointed out that at every decision making level (including the Court's), the analysis focused on the economic rationale and consequences, with decisions being made purely on the basis of economic evidence (Turner Broadcasting v. Federal Communications Commission, 1997). Indeed, throughout the entirety of the "must-carry" controversy, neither the FCC nor Congress ever investigated the fundamental question of whether local broadcast content was significantly different from cable programming (Kim, 1998). Had any of those involved in the decision employed an analytical orientation that required non-economic data, then perhaps the entire validity of the localism rationale might have come into question (see "What's local about local broadcasting," 1998).[6] Ultimately, Justice O'Connor concluded that "the Court adopted the wrong analytical framework" (Turner Broadcasting v. FCC, 1997, p. 1205), a statement equally applicable to Congress and the FCC.

The FCC has frequently neglected to investigate the effects of changes in the competitive environment on various dimensions of diversity (Haddock & Polsby, 1990, pp. 351-352). This neglect led to the Seventh Circuit's rejection of the revised Financial Interest and Syndication rules (Schurz Communications v. Federal Communications Commission, 1992). Judge Posner found the revised rules to be arbitrary and capricious, partly because the Commission never explained how the rules would accomplish their stated goal of enhancing diversity of programming. At the heart of this decision was Posner's skepticism that increases in source and outlet diversity could be presumed to lead to increases in program diversity (see Schurz Communications v. Federal Communications Commission, 1992, p. 1054-1055). The FCC provided no information to alleviate this skepticism. As Posner concluded, "how all this [the revised Fin/Syn rules] promotes programming diversity is mysterious, and was left unexplained in the Commission's opinion" (Schurz Communications v. Federal Communications Commission, 1992, p. 1055).

Despite this judicial flogging, the analytical asymmetry persisted. In a revised effort to relax and ultimately sunset the Fin/Syn Rules, the Commission outlined an empirical plan for the continued monitoring of the effectiveness of the revised policies during the two years preceding their complete elimination. The Commission's stated objective was to determine whether the relaxed rules indeed achieved their predicted effects of enhancing competition and program diversity. The set of factors the Commission identified for continued monitoring included: (a) the relative change in the number of independent producers selling television shows to the networks; (b) each network's share of the first-run syndicated programming domestic market; (c) concentration of ownership in the program production industry; (d) the overall business practices of emerging networks; (e) network syndication practices; (f) the growth of additional networks, and (g) mergers and acquisitions of networks, studios cable systems, and other program providers (Federal Communications Commission, 1993, pp. 3340-3341). These factors clearly reflect the Commission's interest in analyzing the Fin/Syn rules' effects on competition. What should be immediately clear, however, is that nowhere in this list of factors do we see any intention to monitor the rules' effects on diversity of programming. Thus, although increasing program diversity was one of the primary objectives of the Fin/Syn modifications outlined in the Report and Order, the Commission completely ignored program diversity in its plans to monitor the effectiveness of their decision.

Why does this analytical asymmetry exist? There are two primary reasons. The first involves a major shift in analytical orientation that occurred within the Commission over 20 years ago. Historically, the FCC relied on what Corn-Revere (1993) describes as an "intuitive model" for making predictive judgments. Corn-Revere's observation corresponds with broader analyses of traditional regulatory decision making. According to McGarity (1991), traditional regulatory decision making relied heavily upon intuition and experience. Also, "the primary institutional goal [was] to produce rules that [had] a reasonable chance of surviving...legal attacks...it [was] a matter of secondary importance that the benefits of the rule [could] somehow be shown to exceed its costs" (McGarity, 1991, p. 7). The traditional prominence of lawyers among the decision making personnel may help explain this institutional perspective, within the FCC as well as other regulatory agencies (Krasnow, Longley, & Terry, 1982; McGarity, 1991; Williams, 1993). The Commission's consistent lack of financial resources for conducting independent empirical analysis (Krasnow, et al., 1982, p. 15) probably helped maintain the intuitive model as well. The courts have frequently validated these intuitive predictive judgments, granting the Commission "necessarily wide latitude to make policy based upon predictive judgments deriving from its general expertise" (Bechtel v. Federal Communications Commission, 1992, p. 881). This permissiveness on the part of the courts no doubt further entrenched the "intuitive model" within the Commission.

However, in the 1970s, an important analytical shift took place within the Commission, reflecting a broader analytical shift taking place throughout government (McGarity, 1991). Specifically, economic thinking and analysis became increasingly central to FCC decision making (Corn-Revere, 1993). The FCC's personnel make-up shifted accordingly, with a major influx of economists during the 1970s (Williams, 1993, p. 50).[7] The Office of Plans and Policy was created in 1973 to provide the Commission with the capacity for independent economic analysis and planning that it had frequently been criticized for lacking (Napoli, in press). As a result of this shift, economic policy questions have been largely freed from the empirical vacuum of the "intuitive model" (Corn-Revere, 1993). However, for non-economic questions, the "intuitive model," which has a long institutional history within communications policymaking, has not yet been supplanted.

A second reason for this analytical asymmetry can be traced to the nature of the policymaking process. Specifically, interest groups with an economic stake in the outcomes of communications policy decisions typically have greater resources than those interest groups primarily concerned with the social or political effects (Kim, 1995; Linker, 1983). As a result, the public record that provides the foundation for Commission decision making is likely to contain far more economic analysis than social or political analysis.

Given the unique externalities that can arise from communications policy decisions, the degree to which the FCC is both a social and an economic regulatory agency, and the overlap of social and economic objectives within individual decisions, this absence of empirical analysis of the non-economic dimensions of communications policy issues undermines expectations of effective policymaking. This analytical asymmetry needs to be corrected if policy analyses are to account for the full range of objectives and consequences of communications policy decisions.

## Toward an Integrated Analytical Framework

Clearly, the FCC needs to adjust its analytical orientation to accurately reflect the unique nature of communications regulation. It needs to account for the social and political consequences of its policies with the same empirical rigor as the economic consequences, and to give this information full consideration in the decision making process.

The first major change that must take place is for policymakers to work toward developing quantifiable measures of the non-economic dimensions of performance for the communications industries. Advancement in this area will allow for the testing of relationships between economic performance measures and non-economic measures, facilitating an integration of the two perspectives. Consider, for instance, the continuing debate regarding quantifying broadcasters' public interest obligations. Congress held hearings in the early 1980s in an effort to form legislation aimed at quantifying broadcasters' public interest responsibilities (Broadcast Regulation, 1983). Bills outlining plans for the FCC to allocate points for the type, quantity, cost, and placement of public service programming were proposed but not passed (Broadcasting Public Responsibility, 1983; Broadcasting Public Responsibility, 1981). Similar hearings were held in the early 1990s (The Public Interest in Broadcasting, 1991). The issue resurfaced again in 1996 and was debated within the FCC ("'We are going,'" 1996, p. 4). Then-Chairman Reed Hundt (1996) took a strong stand in favor of quantification, arguing that ambiguous standards prevent the Commission from acting in a reliable and predictable manner (pp. 1095-1096). In contrast, then-Commissioner Chong argued that "serving the public interest is simply not a measurable thing" ("'Slippery slope' seen," 1996, p. 7). However, without any quantitative performance indicators, the current analytical asymmetry is likely to persist, particularly given the increased reliance on hard data in regulatory decision making (McGarity, 1991)

Second, the role and function of the FCC's Office of Plans and Policy must be expanded. The OPP's key responsibilities are to act as "the major economic/technical policy adviser to the Commission, analyzing issues and developing long-term policy planning" (Federal Communications Commission, 1998b). As this statement clearly suggests, the OPP performs an inappropriately limited analytical function. Key dimensions of the consequences of communications policies do not appear to fall within its areas of concern or expertise. The current analytical orientation must be expanded, through shifts both in organizational objectives and personnel.

During his tenure as FCC Chairman, Reed Hundt (1996) advocated industry funding of independent institutes devoted to media effects research. These institutes would advise the FCC on relevant policy issues (Hundt, 1996, p. 1099). As Hundt (1996) stated, "Lawyers like myself know that we should rely on . . . social scientists for guidance" (p. 1099). Hundt's proposal reflects the beginnings of the necessary shift in analytical orientation that needs to take place, though it does not go far enough. As this paper has demonstrated, the expanded analytical orientation must encompass more than media effects. Data on audience behavior, media content, and political knowledge and participation (to name a few areas) are equally vital to developing and analyzing policies. Researching these areas lies beyond the range of expertise of lawyers, engineers, and economists. Consequently, political scientists, sociologists, and communications researchers need to become integrated into the analytical process in the same way that economists became integrated in the 1970s. Contrary to Hundt's (1996) proposal, however, this research expertise must be located within the FCC and within the same organizational structure as the economics-oriented policy research. Hundt's proposal for industry-funded research institutes raises obvious questions of objectivity, while the traditional reliance on public interest groups for such research is inadequate given the resource inequities between these groups and the regulated industries. Nor can communications academics be relied upon to fill this function, given that they have traditionally played a very minor role in the policymaking process (Mueller, 1995). Ultimately, the overlaps and interactions between economic and social values policy objectives necessitate reducing the divisions between these areas of policy research and integrating them into the same analytical structure.

In sum, the assumptions guiding the social values elements of communications policies need to rest on an equally strong empirical foundation as the assumptions guiding the economic elements. The empirical validation of such assumptions is essential for effective communications policymaking (Brotman, 1989, pp. 61-62). The analytical shift that took place in the 1970s needs to be accompanied by an additional analytical shift in communications policy analysis. The recommendations proposed here would facilitate progressing to this next stage.

## Conclusion

The analytical perspective that dominates communications policy does not sufficiently account for the unique nature of communications regulation. Communications policy must promote and maintain a competitive and efficient industry, yet at the same time many of its policies originate from value-laden concepts such as the public interest, the marketplace of ideas and diversity (Napoli, 1998). As Bonder (1996) states, "Such important interests as freedom of speech, fairness and equality, diversity of information sources and ideas, public access to channels of effective mass communication, stability of service and public service are ill-suited for analysis under a system of strict economic evaluation" (p. 36). The current emphasis on economic criteria in policy analysis neglects many of the foundation principles in communications policy (see Brennan, 1992, p. 460).

This is not to say, however, that economic analysis should not play a prominent role in communications policymaking, or that deregulatory initiatives are inherently undesirable. Nor is this paper arguing that social welfare objectives should receive a higher priority than purely economic objectives. Such debates are beyond the scope of this paper and are amply discussed elsewhere (Coase, 1959; Fowler & Brenner, 1982; Hagins, 1996; Mayton, 1989; Minow & LaMay, 1995; Read & Weiner, 1996; Sophos, 1990). The key point, rather, is that the decisions must originate from an analytical and empirical orientation that equitably accounts for both economic and social values objectives, and for the unique range of externalities that can arise from communications policies. Indeed, the social effects of policy decisions can lead to economic effects, and vice versa. Consequently, a better-integrated analytical orientation is essential.

This more integrated analytical approach would expand the quantity and scope of information available to policymakers. As a result, decision makers would have access to an analytical record that more comprehensively reflects the range of issues requiring consideration. Thus, from a traditional bounded rationality perspective, decision making quality should increase. Also, a more integrated analytical approach could reduce the degree to which ideology or personal values can guide communications policymaking. Ideological and value shifts within the FCC, as well as within Congress and the White House, have frequently been associated with shifts in Commission decision making (see Napoli, 1997a). Increasing the scope of the analytical data guiding decision making may eliminate some of the empirical gaps into which ideologically-based assumptions are frequently inserted. As a result, the extent to which ideological shifts within policymaking institutions contribute to drastic and seemingly contradictory shifts in decision making may diminish. Finally, a more integrated analytical approach would likely increase the resiliency of FCC policies to judicial scrutiny. As this article has demonstrated, despite their deference to FCC expertise, the courts have frequently invalidated Commission policies on the basis of failure to provide empirical evidence that the policies achieve their social welfare objectives. The courts' demand for empirical evidence suggests that the relationships between specific policies and their non-economic outcomes should always be treated as empirically testable hypotheses if the policies are to withstand judicial scrutiny. In sum, the adoption of an analytical orientation that more accurately reflects the unique nature of communications regulation has the potential to increase the quality, consistency, and resiliency of communications policies.

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## Endnotes

1. That our media system should have a positive influence in these areas has, to varying degrees, remained a guiding principle in communications policymaking. As the Federal Communications Commission (1949) has said: "It is axiomatic that one of the most vital questions of mass communication in a democracy is the development of an informed public opinion through the public dissemination of news and ideas" (p. 1249).

2. For a good example of the difficulty in making such a distinction, see Turner Broadcasting v. Federal Communications Commission (1994), in which the Justices O'Connor, Scalia, Ginsburg, and Thomas disagree with the rest of the Court over whether the "must-carry" provisions of the 1992 Cable Act are content-neutral.

3. Fowler's famous reference to television as a "toaster with pictures" (quoted in Nossiter, 1985, p. 402) provides a good indication of the degree to which he felt speech markets should be regulated like other product markets.

4. It is perhaps telling that, a decade after the elimination of the Fairness Doctrine, its effects on media content remain a subject of investigation.

5. The "must-carry" policy established requirements for cable systems to carry local broadcast stations on their systems.

6. This study found that less than .05 percent of TV station programming has a local orientation.

7. This was in fact the second major personnel shift that took place within the Commission. The earlier "technological to administrative"shift involved an influx of lawyers into an organization previously dominated by engineers (Williams, 1993, p. 46; see also Lichty, 1962).

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Communication Technology and Policy Divison

# Mass Media and the Concept of Interactivity:
## An Exploratory Study of Online Forums and Reader E-Mail

Tanjev Schultz
Indiana University, Bloomington
Free University, Berlin

tschultz@indiana.edu
gatanak@zedat.fu-berlin.de

# Mass Media and the Concept of Interactivity:
## An Exploratory Study of Online Forums and Reader E-Mail

Mass media are well represented on the World Wide Web now. But it is not clear yet how interactive they will be in the online environment. The paper first goes over theoretical implications, discussing the lack of interactivity in traditional mass media. Then it identifies concrete settings and levels of interactivity in online journalism. Finally, an exploratory study of *New York Times* journalists and forum participants helps to illustrate chances and problems of mass media online.

Interactivity has almost turned into a dull buzz word. The term is so inflated now that one begins to suspect that there is much less to it than some people want to make it appear. No company would fail to claim that it is keen on feedback. No leader would fail to praise the arrival of a new communication era. Apparently interactivity has hardly any threatening meaning for the elites. But this was not always so. Long before the Internet was created, the idea of interactivity was discussed by theorists of radical democracy. Guided by their media critique, especially by the Frankfurt School tradition, this paper discusses the position of mass media in the age of the Internet. Applying Rafaeli's explication of interactivity, it identifies different forms of interaction that enable journalists and readers to communicate with each other. Finally two forms, online forums and e-mail to journalists, are examined in the context of an exploratory survey of *New York Times* readers and journalists.

## Mass Media's Lack of Interactivity

In the beginning of the century, intellectuals such as Bertolt Brecht and Walter Benjamin, worried about the limited one-way direction of the new electronic media and worked on an agenda of democratization. Developing his radio theory in the late 1920s, Brecht thought the radio could serve as a democratic apparatus of communication (Brecht 1932; Rollka 1971). Citizens were supposed to "talk back" and play an active part in the program of the new medium – a concept that was directly opposed to radio's propagandistic misuse in European fascism. Yet this misuse was not seen as inherent in the technology. On the contrary, the development of new media seemed to provide ambivalent and powerful tools that at least left open the potential for improving democracy.

Often misinterpreted by identification with Adorno's pessimism, the critical theory of the Frankfurt School nevertheless generated an open-minded approach toward new media (Kausch 1988; Göttlich 1996). Especially Walter Benjamin worked on a more interactive and democratic mass media use, theoretically as well as practically (Benjamin 1963; Schiller-Lerg 1984). Whether optimistic or not, this tradition of an emancipatory media theory dealt in one way or another with the problem that people easily become passive consumers of mass media's manipulated or commercialized content (see Baacke 1974). Soon the critique of audience apathy was adopted by more conservative scholars as well, who viewed the "couch potato" as an attack on their educational values (e.g. Postman 1985).

Obviously these critics did not take an ever-present, active audience for granted. – At least not in the same way as the theoretical empowerment of the audience proclaimed by the *uses and gratifications approach* or some postmodern thinkers. Emphasizing the active process of meaning construction, they helped to overcome simplistic "magic bullet" theories of mass media effects. Nevertheless, this view cannot hide the fact that the old mass media produce their messages mainly independent from the audiences. It still makes sense to keep a distinction between the creation of a message and the construction of meaning by those receiving it (see Jäckel 1995). After all, ordinary people have fairly limited opportunities to participate in the generation of mass media content, not to mention to discuss it with the journalistic and political elites.[1]

This argument of *power* is underlined these days by an incredible process of economic concentration in the mass media market (Bagdikian 1997). The terms *culture industry* (Horkheimer and Adorno 1969) and *consciousness industry* (Enzensberger 1974) seem to be justified today even more than when they were introduced. At the same time, technological development has led to new possibilities of decentralization and interactive media use.

## Interactivity and Integration

Technology now provides more opportunities for an active citizenship than people are prepared to accept (see Entman 1989). Many visions – often by business people – claiming that the new technologies will lead to a participatory wonderland are either naive or well-calculated advertisements. Instead of imagining a "cyberdemocracy" one can simply ask the down-to-earth question, "under what conditions might existing and near-term configurations of communications technology be used to extend democratic practices and lead to a broadened public sphere" (Friedland 1996, p. 186). Taking the position of a deliberative theory of democracy, this objective will be achieved neither by market-driven journalism nor by a permanent polling and measuring of the "public". Ideally, new media will facilitate consensus-finding processes, in which the participants will take part in a public discourse that is free from what Habermas calls the imperatives of the *systems' world*, i.e. money and power (Habermas 1962, 1981, 1994a; Barber 1984; Benhabib 1994).

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[1] For a good, very brief overview of this discussion see Nord 1997, pp. 85-89.

The Internet offers a space that, at least in part, is used in such a manner (see Street 1997). Social movements and local communities definitely can profit from computer networks and help to revitalize the public sphere (Brants et al. 1996; Friedland 1996). Bulletin boards and Internet discussion groups can balance the power and biases of traditional mass media and play an important role in controlling and criticizing journalism as well as in establishing mobilizing types of communication (e.g. Ogan 1993; Valovic 1996). As Friedland (1996) has described, the Internet gives people a fine tool for an "electronic public journalism" that is independent from professional media organizations.

However, these new opportunities involve problems that former media critics really did not face. Communication and participation alone do not mean much in terms of quality and value of content.[2] Eventually, there is a seemingly trivial but most important consideration: The greater the number of communicators, the less time everyone has to listen to others; the smaller the size of interacting groups, the smaller their significance for society as a whole.

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[2] Also, communication can remain without any significant effects as long as it is not transformed into effective decisions and communicative power (see Habermas 1994b; Hacker 1996).

This is one of the reasons why one must doubt whether Internet enthusiasts are right in their belief that the end of traditional institutions of politics and media has come. They suggest that a new elite of "netizens" is going to take over society (e.g. Katz 1997). But on what integrational foundations is the alleged net community grounded? There seem to be few apart from an individualistic rhetoric of free information and a euphoria about thousands of subcommunities to which no one can belong at the same time anyway, not even in bodiless cyberspace. After all, *attention* is one of the most valuable resources in the new era (Rötzer 1996). Economists would call it a very scarce commodity. With a growing number of information and communication forums, some *central sources* may become more important. They can reduce complexity, help users to make judgments about what is important, and build shared beliefs.

I do not think that to consider mass media's function as institutions of integration and as providers of a shared lifeworld means to tread a beaten track. I see a future for this very function (see Price 1995; Saxer 1985; Holtz-Bacha 1997; Wehner 1997). Criticism of mass media power and centralization does not necessarily deny their immense achievements. Jürgen Habermas, for instance, continued the cited tradition of worry about lack of interaction in mass media (e.g. Habermas 1962, p. 261). But he also viewed their integrational role as a benefit of modernism and as a necessary condition for a vivid public sphere in complex societies (cf. Habermas 1981, 1994b; Cohen and Arato 1994, p. 461).

## Mass Media Online

The old one-way mass media are and, taking the developed perspective, certainly should be *complemented* by the new diversity of interactive media. Yet it seems to be a fortune rather than a failure if they will not vanish; even if they already are and probably will be more diverse than in times when only a few radio and TV channels were available. Masses of people still subscribe to newspapers, watch TV programs, and listen to the radio. They will probably continue to do so, especially since passivity is to some extent a natural desire (Vorderer 1995; Schönbach 1997). In addition, of course, every day a fast growing number of users gets connected to the Internet, sends e-mail all around the world, joins online communities, and visits Web sites.[3] But on the Web some sites also become more popular than others. Then they serve as "mass media" on the platform Internet which allows for all kinds of media (Morris and Ogan 1996).

Internet sites of well-established media (e.g. the *New York Times*) can play a decisive role as forums of valid information and serious debate, because they fall back on professional editors. Moreover, they usually reach a lot more people than most of the lesser known newsgroups, bulletin boards, or listservers ever will. Therefore a program of democratization is ill-advised if it concentrates just on opposing the old media, trying to substitute a net of relatively unrelated, grassroots communication. Instead, it seems to be at least as important, if not more important, to revitalize the discursive function of mass media (Merrit 1998). This, I think, implies cutting back the political and economic power of huge media organizations and finding an adequate format for the traditional mass media on the Web. They can provide high quality information and discussion and link to the public outside cyberspace.

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[3] Consumption of other media therefore decreases a little bit, however not necessarily dramatically (cf. for Germany Eimeren et al. 1997). A new U.S. study, for example, shows that the Internet does not have an impact on TV usage levels overall. See: http://www.mediacentral.com/Magazines/MediaCentral/Columns/Morgan/19971112.htm

However, the problem of professional mass media going online is that their economic strategies often do not converge with such a plan. Instead, their interest is to keep a tight rein on the advertising market. At the same time, many online media blend more and more editorial content with advertisements. Further, speed of news delivery is a characteristics of the Internet especially open to exploitation. This has led to elements of pseudo participation, such as quick online polls where mere headlines are used as questions.

Calls for more and better interaction are legitimate. Not only theorists and scholars, but also practitioners have repeatedly criticized the lack of communication between audiences and journalists. After all, this is a major point in the debate on "public journalism" (e.g. Rosen 1991, 1992; Charity 1995; Merrit 1998). As publisher of the *Miami Herald*, David Lawrence Jr., appealed to his colleagues: "We ought to listen more often, and much better, to readers" (Lawrence 1993, p. 16). In his "Ideas for Prospering in a Changing Market", Stephen Lacy suggested an increase in reader input into newspapers, for example, using telephone numbers that people can call to leave comments. Newspapers should use more than one type of feedback system (Lacy 1992, p. 89). It is obvious that the interactive opportunities provided by the Internet can address these criticisms.

But "public journalism" guru Davis Morris is surely right in proposing that journalism online has to be creative and must take its discursive role seriously: "Merely telling the news the same way in bytes and bits instead of by mouth and type may keep some form of journalism alive for a while, but unless that journalism finds a more secure connection with citizens and recognizes its obligation to public life, it, too, will pass" (Morris 1998, p. 138). Maybe it would survive anyway. But the role of journalism has to be reconsidered in a time when, on one hand, the Internet is overwhelming in terms of offered information and interactive opportunities, and, on the other hand, public life and the political culture is crisis-wracked.[4]

At the beginning of the Internet hype a lot of traditional media jumped on the bandwagon and produced Web sites of doubtful value. Three years ago *Wired* editor Jon Katz caught attention by claiming that online or not, "newspapers still suck" (Katz 1994). In fact, his statement that online papers produce just an illusion of interactivity was not just invention. A lot of newspapers simply put the content of their print edition online and made little effort to take interactive options seriously. Most of the online newspapers of that time did not even provide e-mail addresses of their reporters and editors.

## An Explication of Interactivity

Obviously one has to be very careful when applying the term *interactive*. After all, what precisely does it mean? The cited media critics gave no precise explication. Their concepts must be understood within the larger context of a normative theory of democratization. If one wants to evaluate formal differences in the degree to which Web sites give their audience a chance to participate actively, it can only serve as a normative background. Looking for definitions that can be applied to empirical research, but at the same time do not view interactivity only in technological terms, Rafaeli's thorough explication of interactivity and its levels, turns out to be most fruitful (Rafaeli 1988; 1997).

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[4] A problem in debates on public journalism as well as on the Internet is a tension between two different meanings of "public" and "feedback". There are concepts that derive from market-driven journalism and will in my opinion lead to a populistic sell-out of journalism. But there also are more sophisticated ideas of public sphere and processes of deliberation, the stimulation of which should not be confused with simplistic supply and demand operations.

Analyzing group computer-mediated communication, Rafaeli is interested in the *thread* of messages, in the *chain of interrelated messages*. Hence, "interactivity is a variable quality of communication settings" (Rafaeli 1988, p. 111). In other words, the degree to which communication transcends reaction is key (Rafaeli 1997). To distinguish between different levels of interactivity one must ask whether, and to what extent, "later messages recount the relatedness of earlier messages" (ibid.). In interactive communications the communication roles are interchangeable (also Rogers 1995, p. 314).

Although this definition seemingly is based on face-to-face interaction, it can be applied to mediated forms of communication. As Rafaeli has argued, mediated forms can allow for possibilities that would be missed if face-to-face communication was taken as the standard of comparison. Different purposes and tasks may require different communication settings and different levels of interactivity (also Höflich 1996).

Nonetheless, the formal characteristics of fully *interactive* communication usually imply more equality of the participants and a greater symmetry of communicative power than *one-way* communication. The achievement of democratic consensus is related to opinions that are not merely announced but also discussed openly and free from distortions. As Hacker put it: "The more democratic a communication system, the more it will accommodate interactivity over mere connectivity" (Hacker 1996, p. 225).[5]

In one-way communication, one source sets the agenda, receiving no feedback or very indirect feedback. Eventually, in two-way, or reactive, communication one side responds to the other, but such communication remains reactive unless "later messages in any sequence take into account not just messages preceded them, but also the manner in which previous messages were reactive" (Rafaeli 1997).

But Rafaeli also draws a very fine line between two-way and reactive communication: "Two-way communication is present as soon as messages flow bilaterally. Reactive settings require, in addition, that later messages refer to (or cohere with) earlier ones" (Rafaeli 1988).

Rafaeli's model suggests that a lot of use of the new technologies is far from being interactive. Still, along the continuum of interactivity there are settings that make it more likely that full interactivity will occur. Therefore Rafaeli's distinctions can be fruitfully applied to the traditional mass media now online. But one has to take into account that two very different groups are involved here: Journalists and readers.[6] Let me illustrate this by a table that also includes distinctions of time sequences (see Morris and Ogan 1996):

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[5] It is obvious that thereby an empirical criterion is created that can be related to (respectively, rooted in) Habermas' ideal speech situation (cf. for such a connection Gonzales 1989).

| | **Journalist – Reader** | **Reader - Reader** |
|---|---|---|
| **One-Way Communication** | Published articles<br>*asynchronous; one to many* | Published letters to the editor<br>*asynchronous; one to many* |
| **Two-Way Communication** | Letters, fax or e-mail to editors, telephone call-ins<br>*asynchronous; one to one/few*<br>Online forums<br>*asynchronous; one to one/few* | Letters, fax or e-mail to letter writers<br>*asynchronous; one to one/few*<br>Online forum comments<br>*asynchronous; one to one/few* |
| **Reactive Communication** | Letters, Fax or e-mail to editors; responded<br>*asynchronous; one to one/few*<br>Online forums<br>*asynchronous; one to one/few*<br>Telephone calls and conferences *synchronous; one to one and few to one/few* | Letters, Fax or e-mail to letter writers, responded *asynchronous; one to one/few*<br>Online forums<br>*asynchronous; one to one/few* |
| **Interactive Communication** | Online discussion boards<br>*asynchronous; few to one/few*<br>Letter and e-mail conversations *asynchronous; one to one*<br>Chat rooms<br>*synchronous; few to one/few*<br>Telephone conversation; Face-to-face discussions, city hall meetings etc<br>*synchronous; one to one and few to one/few* | Online discussion boards<br>*asynchronous; few to one/few*<br>Letter and e-mail conversations<br>*asynchronous; one to one*<br>Chat rooms<br>*synchronous; few to one/few*<br>Face-to-face discussion (family, friends, public forums)<br>*synchronous;one to one/ few to one/few* |

In the next section I will elaborate on two of the communicative settings: e-mail between readers and journalists and online forums that initiate discussions among readers. In an exploratory attempt, some data and comments from readers and journalists were gathered by small surveys of the *New York Times* staff and participants of the *Times'* online forums.

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[6] For the sake of simplicity I speak of "readers", although one can distinguish between readers and TV/radio audiences.

**E-Mail (Journalist – Reader Communication)**

A tool for increasing interactivity is e-mail. It can serve as a fast and direct channel between readers and editors or reporters. Readers may want to comment on articles, ask specific questions, or request further information about a piece. They may make story suggestions, give valuable news tips, or involve the journalist in a more general discussion about a topic or the media coverage of an issue.

It is not clear how much use readers make of e-mail to individual journalists, or whether journalists are prepared for more discussion with their readers. There are probably two main obstacles: First of all, time schedules in the newsroom do not consider discussions with the audience as an essential part of the job. Journalists have to take extra time when dealing with requests of their readers (reactive), not to mention desirable *interactive* discussions. Second, past research on traditional letters-to-the-editor suggests that reader responses tend to express extreme opinions and often rather crude ideas (e.g. Toch 1960; Davis and Rarick 1964; Lander 1972; Gans 1977). The risk of getting a lot of "hate" and "junk" mail seems to increase with e-mail communication (Cameron et al. 1996, p.10).

One also wonders whether media organizations use feedback in a merely strategic PR fashion, in response to calls for more reader input. When Herbert J. Gans wrote in 1980 that journalists "ignore or dismiss most of the mail" (Gans 1980, p.230), e-mail was not an issue. But when it then became attractive to be part of the online movement, some mass media offered "interactivity" without substance. In early 1994 the TV show *NBC Nightly News* provided an example. Broadcasting a series that dealt with new technologies, they invited their audience to comment on it by sending e-mail. More than 3,000 responses were received from which Newhagen et al. (1995) analyzed 650 messages. NBC's action might have increased the perception of NBC's interactivity with its audience. But the study reports that some e-mail authors "complained to us that they never received a response from NBC. Further, an NBC official admitted that the network had not looked at the mail and had no plans to do so" (Newhagen et al. 1995, p.166).

By now e-mail addresses are regularly provided by many media organizations, including nationwide papers such as the *Washington Post* and the *New York Times*. In addition, some media have launched special e-mail services. *USA Today*, for example, gives readers a chance to "Ask Jack!" – Jack is a weather editor to whom e-mail questions can be sent. They are answered publicly on the Web by a staff of four people (one of them is "Jack"). Besides its apolitical nature, the service remains a reactive and impersonal communication.

To get an idea about the state of e-mail communication between journalists and readers, a small exploratory e-mail survey of *New York Times* journalists was conducted.[7] From a list of 164 staff members who have made their e-mail addresses public, 50 journalists were selected by a purposive sample. Nineteen responses were obtained, making a response rate of 38 %.

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[7] See appendix for more information on sampling technique and questions.

Undoubtedly, there is a difference between reader e-mail and a questionnaire sent by a researcher. Still, it is likely that the journalists who did not respond are significantly different from those who did. The latter might be more open to e-mail communication, more likely to pay attention to reader e-mail, and more likely to respond to it.

The journalists were asked how they evaluate e-mail overall in terms of communication with readers. Most of them were fairly open-minded: six think that "it facilitates communication". Nine claim, a bit more reserved, that "it does facilitate communication but has not yet been used to its potential".

No one marked the category "its importance and impact is overstated". However, a national correspondent called it "basically worthless". This journalist had made the expected bad experiences:

> I have recently been spammed with several hundred letters, and it's a terrible imposition.

In general, the amount of real reader e-mails seems still to be manageable. Five respondents reported having received very few e-mail messages from readers so far; nine receive regularly about one to ten reader e-mails in a month. Two claim to get 10-30 reader e-mails, and an opinion writer got 30-50 mails a month. Most of the respondents (14) also receive 1-10 personally addressed postal letters from readers each month. Not surprisingly, an opinion writer claims to receive more than 50 in a month.

The bad experiences of the one annoyed journalist are not unique. An editor made the comment:

> I'm not including in any of these numbers a string of identical letters of complaint from an organized group (...) which 'spammed' dozens of Times people for a couple of weeks.

An international correspondent reported:

> Some guy upset over lack of coverage on a religious bombing (...) has been sending 5-10 hate messages a day to many of us. Very annoying.

Readers are not the only group that sends messages to the e-mail addresses of journalists. Six respondents said that other staff most frequently write to their e-mail address. A specialized reporter gets most e-mail from sources. Many pointed out that they receive a lot of messages from pressure groups or PR firms.

Story ideas sent by readers are welcome, as a correspondent revealed:

> Once in a while I get a reader e-mail that leads to a story. That's the main reason I read them.

Most reader e-mails are perceived as positive. Fourteen journalists found them mainly "constructive", four "non-constructive", and one was undecided. An editor explained:

> I've found it to be a very positive interaction, with comments about stories, good suggestions and ideas about other stories and constructive criticism.

While four respondents claim that they discuss issues with readers (which is then interactive), 12 journalists said that they usually reply only to concrete questions (reactive). Lack of time is a major complaint:

> I feel that I owe a response to readers who show an interest in what we are doing. The amount of e-mail I get at the moment is very manageable; if it grew to substantial proportions it would be difficult to respond.

A national correspondent complained:

> I am so busy that it (reader e-mail) is one more bother. Most communications from readers are interesting, but usually require some kind of response.

Another wrote:

> Since the NYT has a million daily readers, I would dread the day when all started e-mailing me!

Referring to Gonzales (1989), Kenneth Hacker pointed out that "senders of messages can actively stimulate the receivers to provide feedback. Of course, for interactivity, feedback must be responded to as feedback, not simply as messages" (Hacker 1996, p. 228). The exploratory survey shows that there are indeed at least some journalists who appreciate online communications with readers (see also Valovic 1995). The use of e-mail seems mainly reactive, however. Moreover, journalists' lack of time and the misuse of e-mail by PR firms and pressure groups are serious problems. If journalism becomes more and more market-driven, there might be even less time for journalists to be interactive. Stimulation of receivers to provide feedback then will be in the questionable domain of the marketers.

## Online Forums (Reader-to-Reader Communication)

Many newspapers, magazines, and TV stations run online forums where readers can comment on articles and discuss news topics. Unfortunately, they basically discuss among themselves. From the surveyed *New York Times* journalists, 12 out of 19 admitted that they do not even visit the *Times'* own online forums. Only 6 claim to visit these discussion sites "from time to time". No one visits them regularly[8] , although the respondents were generally open-minded about online communication and do not reflect the attitudes of more skeptical colleagues (see Singer 1997).

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[8] One respondent did not answer the question.

At best, the special online staff that produces the Web sites will take notice of what readers discuss on the forums. But often staff interest will be limited to technical problems, control of the content (so that participants do not violate laws), and decisions about what topics to offer. Even when forums are "hosted" these hosts do not belong to the core staff of the media organization in many cases. Online staff usually are organizationally and often also spatially separated from the newsrooms, which makes it even more unlikely that reporters, columnists, and editors will notice what is going on online.[9]

Undoubtedly though, online forums increase the interactivity of the mass media overall by widening opportunities for reader-to-reader communication. Forums that are surrounded by the online environment of a mass medium have specific advantages over other online settings. One can expect that the discussions will be related to the content of the mass medium. This can ensure that people share some basic knowledge and background, and the discussions have a better chance to achieve a certain coherence (unlike chat rooms that lack defined topics). At the same time, forums may not be overwhelmed by specialists, as is the case in many usenet groups. Also, such forums are not considered to be mere information boards, but arenas of discourse.

A closer look at the online forums of the *New York Times* reveals that there are indeed vivid discussions taking place that are mostly interactive, but they are also problematic in some respects. To learn more about the participants, a survey was conducted in October 1997, using a systematic random sample of 100 participants.[10] The overall response rate was 59 %.[11]

The participants were asked to estimate the number of postings they had made so far that year. Responses ranged between 1 and 1,500 postings, with a misleadingly high mean of 89.[12] People who try to dominate the forums are certainly a problem for the others, as someone explicitly complained:

> I have used the Forum less and less, mainly because there is a hard core of individuals who apparently have little else to do, and appear, at length, on almost every forum I have taken a look at.

The median of 25 posted comments, however, seems to show a more reasonable number. One can infer that the majority has used the forums intensively in fact, but only a minority apparently made it their "hobby". The latter group threatens the participatory opportunities of the others, regardless of how sensible their contributions might be.[13]

One "hobbyist" participant described his motivations:

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[9] There seems to be a new trend to integrate the online staff into the newsrooms, which is certainly a valuable structural form. *Editor & Publisher Interactive* 02/13/98: "Newsrooms bend to the Internet".

[10] See appendix for more information about the sampling technique and the questions.

[11] Which is fairly high (cf. Smith 1997). It is surely accounted for by the high motivation of forum participants. Besides, efforts where made to limit the questionnaire to very few questions according to the exploratory character of the study. Short questionnaires achieve higher response rates, especially online.

[12] Not only because of the high deviation. Also, the sample is a little bit skewed because the posted comments, to which the e-mail addresses were attached, had to be taken as sampling frame. Thus, participants who had posted many messages had a greater chance to be selected than those who had sent just a few messages.

[13] Because of the limited capacities of attention, "lurking" to some extent is a very essential behavior in the new media environment. Realistically, not literally everyone will actively participate in a discussion, but the goal would have to be that everyone at least *could* intervene if he/she really has something to say. So a new discipline is required since the Internet involves a great temptation to publish and communicate *too much*, which consequently weakens the

> These Internet forums and e-mail lists are very important to me. (...) Good quality forums ought to encourage the poster to cite solutions, pretending the poster is the politician or policy maker. I suppose that Internet forums can be considered relatively civilized outlets for ventings.

As a matter of fact, the forum debates are usually highly political and energetic. While this is desirable to revitalize public discussion and the (idealized) coffee-house culture, it surely involves the danger of attracting dogmatists and extremists. One respondent complained:

> The Webmaster told me that the Forum host had considered my responses abusive and that if it occurred again, I would be barred from the forum in question. I find this to be the closest thing to censorship I've seen since the anti-war days.

Yet, what this participant takes as censorship, can be seen as an advantage of forums provided by professional news media. They can be protected against misuse and thus maintain a relatively high quality of discussion. However, looking after them would make even more sense if journalists did not limit themselves to protecting against misuse but actually engaged in the discussion process. Then they could "link" the online happenings to their usual writing. At the moment, the online forums are initiating reader-to-reader communication while journalists are hardly involved.

Participants of the *New York Times* forums not only refer to each other's postings publicly on the forum, but in addition by personal e-mail. Seventy-eight percent had received at least one e-mail that referred to a posting they had made. The more comments they sent, the more likely it was that they also got

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overall significance, and excludes many people just because they cannot keep up and get through the dense communicative jungle.

e-mail feedback. The average estimated number of received e-mails (for that year so far) was 6.8, the median 3, the maximum 50 messages. With regard to the levels of interactivity, it seems important that a majority of participants (80.4 %) had replied to this feedback and continued the discussion by e-mail.

But then they wonder whether the *New York Times* shows any interest in what they say. In a forum that dealt with columns of opinion writer A.M. Rosenthal, a participant asked the somewhat rhetorical question: "I wonder if Mr. Rosenthal ever reads any of these forum messages." Even if he had done so, the forum participants would not have known. They could hardly report any feedback from the *New York Times* itself. Seventy-four percent could not remember having received any feedback from the newspaper's staff. From an open-ended follow-up question it could be determined that in 10 out of 15 cases when feedback was received, it had been comments, suggestions, or warnings from one of the hosts who look after some forums.[14]

Despite the poor feedback that they get from the newspaper, most of the participants frequently visit the forums (71 % say "often"). They also say that they visit the *Times* online sites "daily or several times a week" (79 %). However, only 28 % read the paper edition regularly. From the perspective developed above, it would miss the point to interpret these findings as a success of the online edition. Instead, it might be taken as a sign for a missing interconnection of online and print editions. It appears desirable to connect the traditional mass media with the new online products. The latter can serve as complementary forms whose interactive capacity explicitly blurs the sender-receiver roles of journalists and readers.

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[14] Unfortunately the host that looked after some of the forums from which the sample was drawn, did not reply to a special questionnaire. – A bad sign, speaking of interactivity.

But still more efforts must be made to really take reader response and reader-to-reader communication seriously. Not only would journalists have to participate more often in forum discussions and live chats than they do at present. But the media also would have to reflect what is going on online in their paper products. Newspapers could publish excerpts of forum discussions in their print edition, organize pro- and con- opinion pieces that are written by staff members versus active online readers, or encourage articles by journalists in cooperation with readers. Also, the media could present different versions of stories online and ask for comments. In addition to the peer review, online conferences with readers could be established.

If such offers are broadly advertised in the paper product, and if the stimulation and feedback that is given by the mass media actually take the form of *communicative* instead of *strategic action* (Habermas 1981), more readers might be attracted and motivated to get rid of their passivity. For at the moment, only a special stratum of readers is active and writes letters to the editor or posts comments to online forums. The median of age in the survey was 48.5 years (mean: 44.7 years). Besides, only 19 % of the participants who responded were women, who overall represent about one-third of all online users now. Moreover, more than half of the respondents had a master's or doctoral degree, and almost 28 % more held a college degree.[15]

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[15] Of course, the readership of the *New York Times* in general is not representative for the entire population, either.

## Concluding Remarks

The problem of a widening gap between the "information rich" and "information poor" is not new. Some fear that it now will be reinforced by the new media (e.g. Calabrese and Borchert 1996). This fear might be justified. But as I have pointed out, the mass media still are one of the most efficient and important factors of integration. To balance the confusing variety of the Internet, which favors highly educated people, the mass media should work out popular and, in terms of levels of interactivity, new concepts.

Interactivity does not seem to be an interest of just a minority that is highly active anyway. As a study by Yankelovich Partners Inc. reveals, there actually is a commonly held desire for more true interactivity. This was investigated, however, with regard to online shopping.[16] Hopefully this also applies to political communication, such that people who in the past never would have written a formal letter to the editor can be motivated to take an active part in the public. As Jay Rosen put it: "(T)he problem is not that citizens know too little or participate too rarely to qualify as a public. It is that no one can be a member of a public when not addressed as such by journalists, political leaders, public officials, intellectuals and fellow citizens" (Rosen 1991, pp. 269). A response to this problem surely can begin with local mass media and should not be limited to "elitist" products like the *New York Times*.

Despite their sometimes glamorous rhetoric when it comes to reader response or the idea of "public journalism", local newspapers often are behind in terms of the interactive challenge. From 26 online editions of dailies in Indiana, that were listed by the *American Journalism Review*[17], for example, only two had online forums in December 1997. Two others had a link to an unmoderated chat by Indiana Online. Only one daily had its own chat area, which included moderated rooms on special days. One paper asks for the "vote of the week" on a current problem, using a question with short, structured response categories, plus the possibility to send additional comments. This form of reader response is not really interactive though, and in many cases will tend to a polling attitude that contradicts the idea of a public deliberation process (see Herbst 1993; Patterson 1993; Charity 1995, p. 38).

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[16] http://www.yankelovitch.com

Every newspaper offered at least one e-mail address to which people could send letters to the editor online and comment on the online edition. In most cases, they also provided e-mail addresses of head staff, such as section editors and the publisher. In two cases, readers were specifically encouraged to send news tips and errors. Only eight papers provided e-mail addresses of ordinary editors and reporters.

This study did not take a perspective of media economics which structures many discussions on mass media online (see Dusseldorp 1996; Harper 1996). Worldwide, some hundred TV and radio stations and about 4,000 newspapers and magazines now are online; more than 2,000 of them are U.S. publications. But as the *American Journalism Review* has reported, the boom is coming to an end, and about 100 papers already have pulled the plug on unprofitable Web sites.

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[17] http://www.newslink.org/news.html

If the hype is now over, there is a chance the media will face problems and opportunities seriously. The plea here is that mass media online still have to improve in offering real participation to their audiences. However, it seems also very clear that the mass media will need to continue to address a broad, diverse audience. Interactive communication is not adequate to fully substitute for asymmetric communication processes. It would be a missed opportunity, though, if the Internet lost more and more its interactive character, as is suggested by concepts such as "Web-TV".

The challenge of the future is to preserve the mass media as institutions of integration and public discourse and combine them with a new culture of interaction.

# Appendix

## A) Survey Questions NYT journalists

1. Overall, how do you evaluate e-mail as a communication channel between you and readers?
- Its importance and impact is overstated
- It facilitates communication
- It does facilitate communication but has not yet been used to its potential
Comments:

2. Can you estimate how many e-mails you receive from readers (neither friends nor sources)?
- I've never received any reader e-mail so far
- I've received only very few reader e-mail so far
- I receive regularly about 1 to 10 reader e-mails per month
- I receive regularly about 10 to 30 reader e-mails per month
- I receive regularly about 30 to 50 reader e-mails per month
- I receive regularly more than 50 reader e-mails per month
Comments:

3. Can you estimate how much regular mail you receive from readers (personally addressed; neither friends nor sources):
- I've never received any letters from readers so far
- I've received only very few letters from readers so far
- I receive regularly about 1 to 10 letters per month
- I receive regularly about 10 to 30 letters per month
- I receive regularly about 30 to 50 letters per month
- I receive regularly more than 50 letters per month
Comments:

4. Regarding the content of e-mail that you receive from readers, is it:
- mostly constructive (questions, comments, critical remarks, suggestions)
- mostly non-constructive ("hate"/"junk" mail)
Comments:

5. Which group writes e-mails to your NYT-account most frequently?
- sources
- readers
- staff
- others:
Comments:

6. How do you deal with e-mails from readers?
- Honestly, I hardly have time to read them.
- I usually read them but never or rarely respond.
- I usually read them and respond to concrete questions.
- I usually read them, respond to concrete questions, and also discuss issues with readers by e-mail.
Comments:

7. Do you visit the NYT online forum sites?
- No
- Yes, from time to time
- Yes, regularly

Comments:

## B) Survey questions - forum participants

1. How often do you visit the New York Times online sites?
- Daily or several times a week
- A few times a month
- Less than a few times a month
- Never/not anymore

2. Do you read the paper edition of the New York Times?
- No, or hardly ever
- Yes, regularly

3. You have participated in an online forum of the New York Times. Do you visit these forums
- Often
- Sometimes
- Rarely
- Never/not anymore

4. Can you remember how many comments you have posted to the New York Times forums so far? Please estimate the actual number:

5. Have you received any e-mail so far concerning comments that you have posted to the New York Times online forum?
- No
- Yes

If yes, can you estimate the actual number of these e-mail messages:
Have you replied to some of these messages and continued the discussion via e-mail?
- No
- Yes

6. Have you received any kind of feedback so far from staff members of the New York Times?
- No
- Yes

Finally, I would like to ask you a few questions about yourself.

7. Would you mind telling me how old you were on your last birthday?

8. Are you
- Female
- Male

9. What is the highest grade of school you completed?
- High school
- College degree
- Master's degree/Ph.D.
- None of the above

## C) Note on the Samples

### *1. NYT Journalists*

In the end of January 1998, the sample was drawn from a list of *New York Times* staff members who have made their e-mail address public. The list is sent automatically by e-mail to everyone who requests it. At that time, 164 staff members were listed, most of them actually journalists. 50 of them were selected purposely, making sure that there were included: reporters from different sections, national and international correspondents, topical specialists, political and sports editors, columnists and opinion writers.

Before sending the questionnaire information was obtained whether an official policy at the *New York Times* regulates how journalists should deal with reader e-mail. Apparently, no such policy exists.

Fourteen filled out questionnaires were received after eight days. A reminder resulted in 5 more, plus three refusals. Altogether, 19 responses were received, making a response rate of 38 percent.

### *2. NYT Online forums*

The sample was drawn from *New York Times* online forums on October 16th, and 17th 1997. Then 130 questionnaires were sent to forum participants who had posted a message to one of the forums of the categories:

- "In the News": 15 forums (excluding an archive) with about 6250 postings
- "National Issues": 13 forums (excluding an archive) with about 5000 postings
- "International Affairs": 3 forums (excluding an archive) with about 1500 postings
- "Opinions": 9 forums (excluding an archive) with about 740 postings

Altogether 40 forums with about 13,490 postings were included. The *New York Times* online at that time run a couple of other forum categories such as "Metro News", "Financial", "Women's Health", "Arts and Leisure", "Sports" and "Books" which were not included in part for practical reasons, in part because of a focus on political discussions.

Some of the forums were hosted, most of them were not. "Hosted" in this case means that someone who was hired by the *New York Times* (but not necessarily an editor), took responsibility for the forum discussions. Sometimes hosts participated in the forum posting own comments. At the time of the survey, 6 of the main forum categories were hosted, plus 8 forums within other main categories. In the sample this is reflected by one main category which was hosted. To the host a special questionnaire was sent. Unfortunately she did not respond.

From the stratified forum sample participants were randomly and systematically selected by their e-mail addresses that were attached to their comments. Most of the forums documented postings from two or three month ago to the present, some new forums just from a few days ago. Choosing participants by a systematic random sample made sure that people were included who had posted comments just recently as well as people who did it quite a time ago. However, participants had no equal chances to be selected, for participants who had posted a lot of messages were more likely to be selected. If a participant had already been chosen, the next one was taken, of course. Nevertheless, accidentally the questionnaire had been sent to five persons twice. Therefore the sample actually contained 125 participants. Exactly 25 messages could not be delivered correctly so that presumably 100 people received the questionnaire.

After one week, 44 responses were received, plus one refusal. After a reminder another 15 filled out questionnaires, plus 2 refusals were received. Not taking into account undelivered messages as part of the sample and explicit refuses not as responses, the overall response rate thus is 59 percent.

## D) Tables from the survey of *New York Times* forum participants

**Age of NYT forum participants**

| | N | Mean | Median | Minimum | Maximum |
|---|---|---|---|---|---|
| Age | 54 | 44.7037 | 48.5000 | 15.00 | 75.00 |

**Gender**

| | Frequency | Percent |
|---|---|---|
| Female | 11 | 19.3 |
| Male | 46 | 80.7 |
| Total | 57 | 100.0 |

**Education**

| | Frequency | Percent |
|---|---|---|
| High school | 9 | 15.5 |
| College degree | 16 | 27.6 |
| Master's/Ph.D. | 30 | 51.7 |
| None of the above | 3 | 5.2 |
| Total | 58 | 100.0 |

**Read paper edition of New York Times?**

| | Frequency | Percent |
|---|---|---|
| No, or hardly ever | 42 | 71.2 |
| Yes, regularly | 17 | 28.8 |
| Total | 59 | 100.0 |

**Visit New York Times online?**

| | Frequency | Percent |
|---|---|---|
| Daily or several times a week | 47 | 79.7 |
| A few times a month | 8 | 13.6 |
| Less than a few times a month | 4 | 6.8 |
| Total | 59 | 100.0 |

**Visit New York Times online forums:**

| | Frequency | Percent |
|---|---|---|
| Often | 42 | 71.2 |
| Sometimes | 9 | 15.3 |
| Rarely | 7 | 11.9 |
| Never/not anymore | 1 | 1.7 |
| Total | 59 | 100.0 |

**Posting activity and feedback**

| | N | Mean | Median | Minimum | Maximum |
|---|---|---|---|---|---|
| Number of postings | 56 | 89.8571 | 25.0000 | 1.00 | 1500.00 |
| Number of received e-mail comments | 57 | 6.8772 | 3.0000 | .00 | 50.00 |

**E-mail feedback?**

| | Frequency | Percent |
|---|---|---|
| No | 13 | 22.0 |
| Yes | 46 | 78.0 |
| Total | 59 | 100.0 |

**Reply to e-mail feedback?**

| | Frequency | Percent |
|---|---|---|
| No | 9 | 19.6 |
| Yes | 37 | 80.4 |
| Total | 46 | 100.0 |

**Feedback from NYT?**

| | Frequency | Percent |
|---|---|---|
| No | 43 | 72.9 |
| Yes | 16 | 27.1 |
| Total | 59 | 100.0 |

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# Interactivity: A Qualitative Exploration of Definitions and Models

by Sally J. McMillan, Ph.D.
and Edward J. Downes, Ph.D.
both are Assistant Professors
at Boston University

Prepared for the Communication Technology and Policy Division

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Baltimore, MD

Direct correspondence to the first author at:
**Boston University**
College of Communication
**640 Commonwealth Ave.**
Boston, MA 02215

Phone: 617-353-4294
e-mail: sallymcm@bu.edu

# Interactivity: A Qualitative Exploration of Definitions and Models

ABSTRACT

The literature on interactivity includes many assumptions and some definitions but few tools for operationalizing the concept of "interactivity" in computer-mediated environments. This paper takes an early step in filling that gap. In-depth interviews with 10 individuals who work and teach in the field of interactive communication led us to a six-dimension conceptual definition of interactivity. Based on these dimensions, we propose a Model of Cyber-Interactivity which we plan to test empirically in future research.

The word "interactivity" is used by marketers to describe products ranging from snoring dolls and Web-based brochures to video games and online transactions. Scholars have adopted the term to refer to everything from face-to-face exchanges to computer-mediated communication. However, much of the literature, both popular and scholarly, discusses interactivity with few or no attempts to define the term. Even when definitions are found they are often contradictory. Such imprecision invites research, such as that reported by this paper, which adds shape and form to the concept of interactivity and suggests necessary foci for a conceptual definition.

This paper begins with a synopsis of the literature and explanations therein of the term "interactivity." Next, this paper describes interviews with individuals who are involved with emerging technologies. A qualitative analysis of their responses to interview questions revealed multiple themes that seem to underlie the concept of interactivity. After careful consideration of both the concepts found in the literature and the themes that emerged from the interviews, the authors proposed a conceptual definition of interactivity based on six dimensions. Those six dimensions are used to construct a Model of Cyber-Interactivity. Finally, suggestions are made for how this emerging definition and model can be used in future research.

## LITERATURE REVIEW

An extensive body of literature exist about interaction in human communication. Much of this literature grows out of a sociological tradition. For example, the simultaneous transaction model addresses real-time, interpersonal exchange between individuals and is often framed in terms of interaction.[1] Another body of research examines interaction of human beings with computers. This literature grows out of the computer science tradition and focuses on improving the interface of computer hardware and software. Thomas described the study of human-computer interaction as a "situated, particular, detailed, gritty, error-prone, and largely nondetermined reality."[2]

Only in the past 10 to 15 years have scholars in the mass communication tradition begun to examine the nature of interactivity in computer-mediated communication. Rafaeli was one of the early investigators of interactivity in the mass media context. He studied a range of interactive environments.[3] In the late 1980s, Rafaeli posed a definition of interactivity in computer-mediated environments: "An expression of the extent that in a given series of communication exchanges, any third (or later) transmission (or message) is related to the degree to which previous exchanges referred to even earlier transmissions."[4] By 1997, he had revised that definition to: "The extent to which messages in a sequence relate to each other, and especially the extent to which later messages recount the relatedness of earlier messages."[5]

We chose to focus our search for the definition of interactivity on this relatively new body of literature that focuses on computer-mediated communication. Examination of technologies such as the Internet and its graphical subset, the World Wide Web, has led researchers to the conclusion that interactivity is a key advantage of the medium.[6] But what is that interactivity?

Answering this question is not a simple task. Braman, who developed an approach to defining the concept of information, noted that definitions of core communication concepts (such as information and interactivity) are critical for policy makers and may have dramatic impacts on society. Nevertheless, attempts to settle upon a single definition are problematic because these concepts are multi-faceted and because multiple definitions apply concurrently. In examining information, Braman identified four broad groups of definitions: information as a resource, as a commodity, as a perception of pattern, and as a constitutive force in society.[7]

Like information, interactivity is not a monolithic concept. But, because it is an emerging field, examination of interactivity must be narrowed. This study focuses on how individuals perceive interactivity in the context of computer-mediated communication. Of the four approaches suggested by Braman, defining interactivity based on perceptions of individuals is most similar to her resource-based category of definitions. She suggests that resource-based definitions are easy to comprehend, widely applicable, and open to extended applications in a number of different settings. The literature suggests multiple concepts that help to explain how individuals perceive interactivity in the context of computer-based communication.

Heeter suggested that users exert more effort when they attend to interactive media than they do with traditional media forms.[8] However, McMillan found it was difficult to operationalize this concept of effort in an analysis of Web sites.[9] Therefore, in the present study, we explored the relationship of effort to interactivity during our interviews with experts in the field of interactivity.

Role-taking and feedback are two additional concepts that have appeared in several studies of interactivity. In the early 1980s, Rice suggested "fully interactive media imply that the sender and receiver roles are interchangeable."[10] More than a decade later, Rogers echoed the same theme when he defined interactivity as "the degree to which participants in a communication process can exchange roles in and have control over their mutual discourse."[11] To explore the importance of role-taking and feedback, we asked interview respondents to discuss these concepts.

Steur defined interactivity as "the extent to which users can participate in modifying the form and content of a mediated environment in real time."[12] Rice and Williams also focused on the issue of real-time communication and suggested that media are interactive if they have the potential for immediate, two-way exchange.[13] But not all observers agree about the importance of real time. For example, Rheingold suggested that the asynchronous characteristics of tools such as e-mail, newgroups, and listservs is one of the key benefits of these interactive media.[14] The importance of time in interactive communication was also discussed in interview sessions.

Chen suggested passivity and interactivity are qualities of individuals making use of media, not qualities of the media *per se*.[15] Other researchers also suggested that individual uses are more important than media features in determining interactivity.[16] Some researchers, however, have argued that some technologies permit more interactivity than others. For example, Snyder focused on ways in which the non-linear nature of hypertext enhances interactivity.[17] In interview sessions, we asked about relative importance of media and participants in interactive communication.

Changes in patterns of control are another issue researchers and observers are beginning to link to the concept of interactivity. O'Keefe noted the Web provides a two-edged sword. On the one hand, organizations have a robust media environment in which to tell their own story in their own words. On the other hand, they cannot control exactly what route individuals will take after they arrive at a Web site.[18] The issue of control was central to many of our interview sessions.

Ha recently identified information collection as a key dimension of interactivity.[19] Blattberg and Deighton have identified the tracking of audiences as a key advantage that computer-mediated communication systems offer to marketing communicators.[20] Dreze and Zufryden noted both the importance that marketers attach to tracking users in interactive environments and the concerns that consumers have about losing their privacy in the process.[21] However, the potential benefit for users is that as their activities are tracked, messages can be customized to match their interest. In interviews, we asked participants to discuss the importance of information collection and tracking in interactive environments.

Other studies have focused on advantages and disadvantages of interactive media. For example, Ang and Cummings found that computer-mediated environments enhance information-seeking.[22] Schaeffer and Hannafin found that recall was significantly enhanced by increased interactivity.[23] Sproull and Kiesler reported that, within organizations, electronic work groups can be as efficient or more efficient than face-to-face work groups.[24]

Finally, some researchers have associated disadvantages with specific computer-mediated communication forms. For example, Markus reported that electronic mail filters out personal and social cues and this may have consequences such as "flaming," public rebuke of senders, and depersonalization.[25] Other commentators have suggested computer-mediated communication goes beyond simple disadvantage to real or perceived threat. For example, Stolz criticized computer-based communication as a threat to "real world" interaction among people in public places.[26]

In summary, the literature suggested that examination of interactivity should include attention to: user effort, sender and receiver roles, timeliness, characteristics of both the medium and the communicator, control, activity tracking, advantages, disadvantages, and potential threats. These were examined in the interviews.

## METHOD

Based on the literature reviewed above, we developed a structured interview instrument for use with a panel of experts (see Appendix 1). A script of 10 questions was written before interviews began, and each question was asked in the order presented. Occasionally a follow-up inquiry was made (Tell me more about that? Can you expand on that thought?). This structured format, relative to one that was unstructured or more loosely structured, met our objectives. We wished to limit the interview to defining the concept of interactivity while opening the door for serendipitous insights into related issues which came from the initial responses to the questions.[27]

The data were gathered during 10 face-to-face interviews conducted in January and February, 1998. Each lasted between 20 and 90 minutes with an average time of 40 minutes. Respondents were selected to meet specific criteria. Those selected: 1) served or recently served as university faculty, and 2) worked or recently worked outside of academia in the field of emerging communication technologies. Descriptions of each respondent are provided in Appendix 2. Real names are not used because respondents were promised anonymity.

We believed it was necessary to qualify interactivity before we quantified it. Thus, our purpose in conducting the interviews was not so much to help us to know what interactivity is, but rather to help us to understand and to explain it. To accomplish this, we sought the breadth of informed opinion and shared intuition which, collectively, was housed in our respondents' backgrounds and experiences.

After interviews were completed, we read and re-read transcripts looking for responses that would provide shape and form to the concept of interactivity. Each of the primary researchers, as well as two graduate students who are developing expertise in the impact of new technologies on communication management, read the transcripts. Each sought pervasive themes. Each read and re-read sections of the data, sometimes as much as a dozen times. We then reconvened, read the transcripts aloud, and determined themes on which there was wide agreement. The findings section below discusses only those themes on which at least three of the four coders agreed.

We had several qualitative methodological options. We chose to utilize interviews because, on balance, they appeared the best method by which to realize our goals of: 1) uncovering the subjective side of how the notion of interactivity was viewed; 2) providing background context and hypotheses for a future, quantitatively driven research phase; 3) documenting the evolving nature of the concept of interactivity; and 4) quickly obtaining large amounts of contextual data.[28]

The collection and analysis of these data is rooted in a phenomenological paradigm which holds that reality (here, the reality of those who both teach and practice computer-mediated communications) is socially constructed.[29] These individuals seem to be in an ideal position to identify the concepts and parameters of interactivity and to tell what the notion, in its present state, is. Further, the affirmatives represented in the themes provided rich insights into feelings, personal experiences, empathies, emotions, intuitions, subjective judgments, imaginations, and the diverse forms of creativity held by respondents.[30] Naturally, every effort was made when writing results to allow the words of respondents to define the parameters related to the concept under investigation.

## FINDINGS

The interview data suggested five key themes: confusion, revolution, structure, behavior, and consequences.

### Confusion

The first impression to emerge from review of interview transcripts was confusion. Respondents disagreed with each other about key concepts such as the importance of "real time" in interactive communication, the amount of effort interactive communication requires, and even whether human beings are an integral part of interactive communication. Internal disagreements were also found. For example, Joseph began by asserting that interactivity is typified by conversation but later indicated that transactions are one of the most "intensely interactive processes." Furthermore, phrases such as "I am not sure yet," and "I can't define it, but I know it when I see it" were used by many of the respondents.

Discussions of interactivity were also characterized by a rather confusing mix of terms. For example, Rita used the terms "interactivity" and "multimedia" almost interchangeably. When asked whether the terms were synonymous she replied: "Yes and No. All things in life are multimedia. The entire spectrum is also interactive. The new-technology multimedia works on the same concept with different tools. Multimedia for me is ancient. Interactivity is ancient. The tools are new."

The concept of hypertextual links was also often mixed with the concept of interactivity. For example Will said: "I can rearrange, sometimes, the content where I am no longer bound to a linear fashion because of hypertext. So that would be an interactive multimedia experience." In sum, while respondents indicated the concept of interactivity was multi-faceted, they neither agreed on its parameters nor on the major concepts inherent to it.

## Revolution

Both internal and external inconsistencies were found among respondents concerning the nature of computer-mediated interactivity. Is it something revolutionary or just an adaptation of very old communication models. For example, Pam suggested that interaction has long been studied by sociologists and that computer-mediated interaction is really nothing new. Dennis suggested that the literature on interpersonal and organizational communication holds the key to understanding interactivity. Both Jake and Will noted that computer scientists have been studying interactivity for years in the context of human-computer interfaces. And Jeff suggested that interactivity is the traditional communication model with a robust feedback loop. Thus, while parts of interactivity may be revolutionary, other parts seem to be nothing new.

Some respondents lauded the revolutionary nature of the computer as a communication medium. For example, Joseph said the computer claims to "do it all – video, sound, music, good quality, text, and images and voice." This medium was also portrayed as breaking down walls between advertising and selling, marketing and fulfillment, and organizations and their publics.

However, some respondents identified unique flaws in the medium. For example, two respondents noted specific problems with e-mail. Pam addressed sending of e-mail: "Because it [e-mail] is so casual, so fast, you dash it off, forgetting about the impression on your colleague." On a similar note, Jeff shared his impression that, "few receivers seem to read e-mail carefully and thoughtfully."

Despite the highlighting of both positive and negative "revolutions," most respondents talked about interactivity in relatively traditional terms. Most referred regularly to senders and receivers, creators and audiences, and developers and users. However, several suggested that new relationships were developing among those who create and those who consume messages. For example, Joseph suggested that the computer-mediated environment allows for "three-party interactivity" involving two people and a computer. While the terms sender and receiver were used frequently to suggest a kind of dichotomous relationship, many also expressed the belief that in interactive communication the roles become interchangeable.

In sum, respondents viewed interactivity as something old, something new, something borrowed from other disciplines, and something both people and computers do. While no clear consensus emerged about the revolutionary nature of the medium, most respondents used terminology, such as sender and receiver, that suggests a traditional communication model.

## Structure

Three structural elements emerged from the interviews: 1) the nature of the computer as a medium of communication, 2) the importance of time, and 3) the creation of a sense of place in computer-mediated environments.

### Media

Most respondents said the computer is closely tied to their concepts of interactivity in this environment. Some believe the computer provides an ideal medium for facilitating communication. For example, Joseph said: "The Internet was designed with interactivity in mind. All of its technical makeup and its design from the beginning were interactive." He also indicated that one of the key advantages of the computer as a medium is that it can integrate functions that used to be split between active and passive media. He illustrated with a comment on interactive advertising:

> Right now advertising has little to do with buying and selling. It's done through a different medium, at a different time, in a different place, with a different purpose. Right? We don't advertise to sell something. We advertise to change someone's attitude or image or proclivity (mental state). And we do it through a passive mass media. Buying and selling, we do in a whole different atmosphere, whole different system that involves transactions. Now we have a medium that can do both.

Jake sought balance in describing the medium: "The important thing still. . .is the humans behind the medium. Having said that, it is important to have a good *medium* so you can interact.

So if you have e-mail or the Internet you have a good medium for interaction."

Others, however, expressed concern that the computer is less than a perfect medium for some types of communication. Kent shared a story of "cyber-flirting." He met a girl online through a matchmaking service. They exchanged e-mail for several weeks. "I was convinced I was in love with this person," he said. They shared many things in common, enjoyed the same humor, shared a depth of knowledge about popular culture. He saved all her e-mail messages. "I could go back and laugh at it later – days later, hours later. I could go back and think about that funny thing which you can't do as well with phone conversations." Within a few weeks they talked on the phone. And he knew instantly that the magic that existed in e-mail was missing from their voice conversation. They met, and were further convinced that the relationship they had built online just didn't exist "in the real world." It was not that either was particularly unattractive, Kent said. It was just that in the "unedited" environment of real-time exchange by voice or face-to-face communication they could not experience the same excitement and fun that they found in carefully crafting messages by e-mail. Kent summarized the experience:

> I don't know what to take out of there but there is definitely something interesting there. Interaction via e-mail. Real time interaction versus chat. And how that is different from real time interaction via voice and meeting face-to-face. Timing makes a difference and meeting makes a difference. Interesting experience, but the medium can alter your opinion of someone.

Rita also expressed some concerns about the ability to "edit" and "select" messages in computer-mediated environments through a discussion of layering. She said:

> It [interactive multimedia] forces you to adjust and pick exactly the right layers, because multimedia is layered. When you layer you have to go and look at the distance between the layers. Sometimes the message is inside these gaps. It is much more sophisticated. Also the users are much more sophisticated these days. They expect you to give them more – to give them that unique gap between these layers. You have to be an editor in the process, through the process until the very end. New technology is also dangerous because it makes you edit, and it doesn't leave anything primal.

Rita also suggested that in some ways the medium outweighs the message. "A message that is right today may also be right 100 years from now, but the medium that brought that message will make the spin, that special spin, that sometimes will become the message itself."

In sum, while many respondents lauded the benefits of this new medium, several also indicated concern about the limitations inherent to computer-based interactivity. In particular, they experienced a sense of falseness when such communication became personalized and called for a deeper, shared meaning.

### Time

As some respondents talked about interactivity they suggested that the closer to "real time" an interchange, the more interactive it becomes. Kent said: "This is probably because most of the interaction in the past was in real time." Dennis also stressed the importance of timeliness: "I think it [real-time communication] is incredibly important. Almost by definition, interaction requires immediate response." Will echoed similar ideas and placed them in an interpersonal context: "The closer you can get to the human exchange the more valuable it becomes."

Other respondents did not believe timing of messages is central to interactivity. Jake said: "Real-time is not at all important. I can send mail to you and if you are there, you can give me the immediate response. But if you are not, you can log in a couple of hours later or another day. And still you will be able to respond to what I said. Which to me is a plus." Pam took a situational perspective. She said: "Obviously, the closer it is to that immediate time, then, I think it fits. . . it's *more* interactive." Joseph was even more situationally oriented in his discussion of the role of timing: "Time is important, but you have to consider it in terms of the nature of the conversation. When do we expect and need immediacy, and when do we expect and need a delay?"

In sum, while there was a consensus that media such as the Internet allow for interaction to take place at different times, there was a wide range of opinion as to whether real time is necessary for such an interchange to be labeled interactive. A key issue seems to be that participants have some control over the timing of messages in computer-based interactive environments.

## Place

The final structural element that emerged from our interviews was sense of place. Several respondents indicated that interactive computer-mediated communication can transcend geography to create a kind of virtual place. For example, Kent said the online world "seems to create public places again." In these public places people can meet on the basis of "what they are thinking and writing" rather than on the basis of physical characteristics such as appearance, status, etc.

Many respondents referred to the "place" where computer-mediated communication occurs. For example, Joseph said "interactivity goes on right there in that computer and person." Similarly Bob referred to highly interactive Web sites as those that "invite you back time and again" suggesting that the site visitor is not only viewing but being transported to a specific place.

Two respondents focused on ways the multimedia nature of Web sites can create a sense of place. Will described a future in which Web sites could have the ability to let him pre-tour his vacation location by immersing him in media experiences ranging from text to contextual video . But he noted a potential downside to such a sensory-rich experience: "If I can get the full experience in the synthesized form, do I need the place?" Similarly, Dennis envisioned the total immersion of virtual reality as an advanced form of cyber interactivity. By utilizing multiple types of media and response mechanisms, the computer can be completely responsive to his actions.

In sum, respondents suggested that the more interactive a computer-mediated communication environment becomes, the more likely that the individual will feel that he/she has been transported to a virtual place. In those places, they may encounter experiences ranging from a resurgence of public life to an immersion in a solitary gaming environment.

## Behavior

Two behavioral issues emerged from our interviews: effort and control. In many ways these two issues are closely related, but the two concepts were each articulated in the interviews and deserve separate attention.

### Effort

The issue of effort elicited disagreement and confusion from respondents. During the course of the interviews, some seemed to change their minds about the level of effort required in interactive media. For example, Kent said:

> I think interactivity requires a lot of effort. But on the Web it seems that viewers are very passive still. People don't want to work on the Web. There is effort, but there is payoff because you have so much information. It is less effort in a way. I would rather make a decision [about purchasing an airline ticket] myself and see all the options than work through that person who is reading stuff off the computer. So, I see it as less effort and more empowering.

Several respondents believed interactivity requires effort. Some talked about the effort of sending messages. For example, Joseph suggested interactivity requires twice as much effort as traditional mediated communication because communicators have to think about how to present information and also about how to respond to information they receive. Others talked about the effort of receiving messages. Dennis suggested that effort is "the definition of interactivity, because if you are giving control to me then the output requires my exerting that control."

Other respondents said interactive communication requires little effort. Jake said: "It requires less effort. And the reason for that is it could be done anywhere, anytime, as opposed to having to have all the members of the group meet together at one specific time, one specific place."

In sum, consensus about effort may be found in comments of several respondents who suggested that interactivity *shouldn't* require any extra effort – but the current state of technology is less than perfect and these imperfections cause the participants to exert effort.

## Control

The issue of control was inherent in some of the above discussions of effort. However, respondents also talked about control outside of the context of effort. Some respondents focused on control from the sender's perspective and some from the user's point of view. Pam's comments summarize user-oriented perspectives about control:

> I think control is a critical factor. Maybe it's kind of the central factor. It's not just that I determine where I go or what content I view or what buttons I select. It's that I control the timing, I control the content, I control to whom I'm going to address this. I control, in some respects, with whom I want to have this exchange and interaction.

Dennis also expressed the opinion that interactive media shift control to the "users" of the medium. He said that this shift can be very troubling to professionals who have become accustomed to controlling the content of traditional mass media:

> The true meaning or the consequence of greatest import in interactivity is that we are transferring control to the user. The control of production is one issue, but that only matters to us as professionals if we perceive that the control of production somehow contributes to the control of perception and understood meaning. Every time you give the user more control it means you have even less control over the potential meaning than could be derived from your information.

Not all respondents, however, believed that interactive communication shifts control to the user. Bob acknowledged that such a shift might be an ideal to strive for, but it is not yet a reality:

> At this time, the author has the control. The person who has put together the game, or the Web site, or the information has the control. They set the parameters for the response on the part of the user. I think as we train students to become authors, to become producers of interactive material, the goal is for them to set the parameters as deep as possible and as wide as possible so that the user perceives that he/she is in control. Are they really in control? Not yet.

Finally, Jeff suggested that issues of control in computer-mediated communication are not new concerns, but are rather new manifestations of very old issues:

> The deciding factor is money. Advertisers pay for space and time in the media. Public relations personnel seek a free ride. In either case, media personnel do what is best for the media. That usually translated to bottom-line considerations. So 'control' can be purchased. I would say that interactive communication will probably encounter only old 'issues' of control rather than any new ones.

In sum, respondents were in general agreement that while the sender has control of the message, the receiver has control as to whether he/she will: 1) indicate to the sender that the message was received, 2) attend to the message, or 3) pretend that it was never sent. Thus, it would seem that the receiver has control over the feedback loop in a way more characteristic of mass media than of interpersonal communication.

## Consequences

Respondents seemed to be fairly unanimous in their belief that computer-mediated interactive communication is having, and will continue to have, far-reaching consequences. Joseph illustrated this consensus when he said: "It threatens whole industries, it threatens whole professions." Dennis expanded this discussion primarily to communication professionals:

> For those people who have traditionally distributed information in a one-to-many model, interactivity is changing the way you can do or should do business because the opportunity now exists to put control in the hands of the user. The implications of that, I think, are truly interesting things about interactivity.

Amy discussed consequences in terms of the organizational communication environment:

> The old paradigm of 'if knowledge is power, he who owns the knowledge owns the power' means that sharing knowledge can undermine one's security in corporate America. That doesn't mean it's doomed to failure, just that many cultural issues must be addressed before you can reasonably expect people to share.

Bob brought the concept of consequences to the personal level: "One cannot anticipate the consequence of getting out on the Web and providing information that's important to *you.*" He went on to discuss how interactivity can be empowering to the individual operating outside the corporate structure:

> There is quite a bit of anarchy out there – which is *encouraging*. The fact that I can become a spokesman for solar power, not because I spent the money to get the house built, but because of a site on the World Wide Web is, I think, totally threatening to the power company. Because I have a voice now. I think the threat is to existing institutions and the old ways of doing things.

Power seems to be the primary consequence. Institutions and professional communicators risk losing power while individuals participating in a collaborative and interactive environment could be gaining power. But the balance of power is not yet clear. Rita poetically summed up the potentials: "The misrepresentation that you can do with multimedia can be tremendously bad. Also, the other side is that you let other people create their dreams. Dreams and nightmares."

In sum, respondents were in general agreement that computer-mediated interaction has far-reaching consequences with the potential to change entire industries and forge new paradigms. Their comments suggest that if the power shifts they envision unfold, communication "management" may become an oxymoron.

## DEFINITION AND MODEL

Joseph told us that any attempts to define interactivity are futile at this point in time. "Nobody knows, because the field of interactive communication is in its infancy, what the possibilities are. You have to base your definition of interactivity on what's out there. And it changes every day. So your definition is going to have to be a bit loose in the beginning." Bob confirmed the evolutionary nature of computer-mediated interactivity:

> We don't know what it's going to be. It has its own momentum, in part set by the communication industry, and the software industry, and the *user's* settings. We don't know where it's going, except that it's going *real* fast. And a slight shift in its heading will head it off in another hemisphere, if we're not careful.

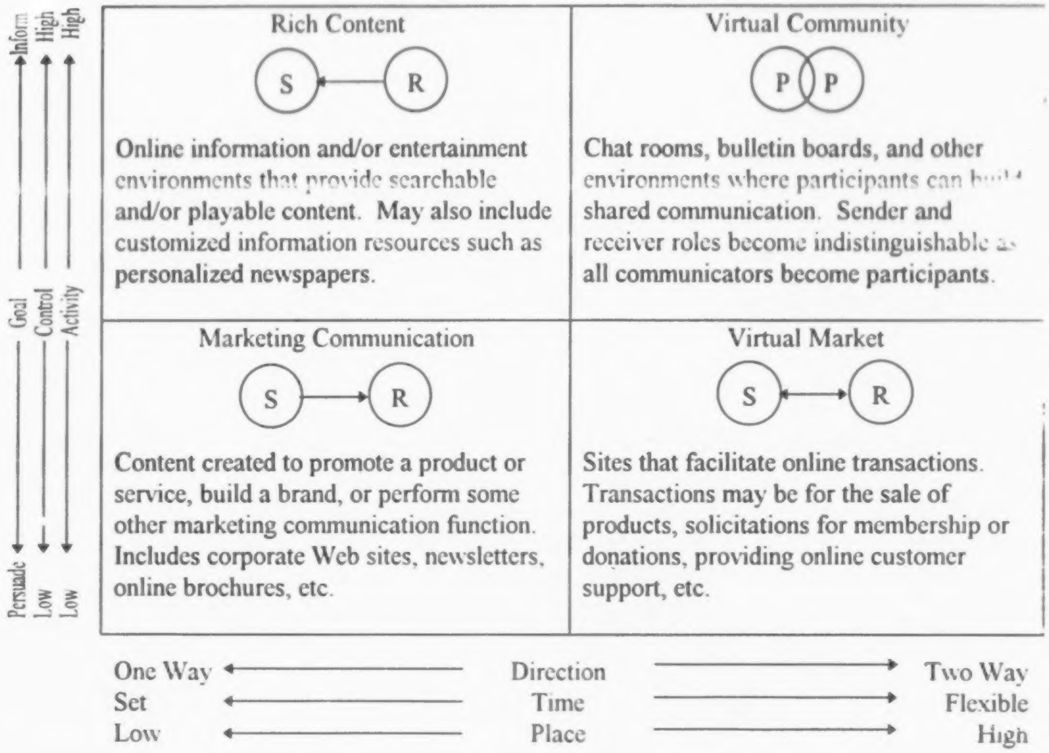
Several respondents told us interactivity is not a simple concept. Joseph said: "It's not a single dimension. You are not trying to argue this is interactivity, this is not. You're just trying to say that it includes these things." Pam said: "Interactivity is going to be a continuum, I think." Finally, Rita reminded us interactivity is ancient: "Greek theater was the first multimedia. It used actors, music, settings, the choir, and everything. Interactivity was also there. Interactivity happens when the two sides are feeling each other and are influenced by the other's reactions."

Despite the evolving nature of computer-based interactivity, we believe that a conceptual definition does emerge from the concepts found in the literature and in our in-depth interviews. However, it does seem clear that interactivity is a multi-dimensional construct. As noted earlier, we are choosing to focus primarily on individual perceptions of interactivity. We believe that six dimensions may help to define interactive communication in this context: goals, control, effort, direction, time, and place. Most communication in computer-mediated environments may be interactive. However, we believe varying levels of interactivity exist. Thus, we suggest that interactivity increases as:

- Individuals perceive that the goal of communication is more oriented to exchanging information than to attempting to persuade,
- Participants perceive that they have greater control of the communication environment,
- Participants believe they must take an active role to fully benefit from communication,
- Two-way communication enables all participants to act and react to messages,
- Timing of communication is flexible and responsive to time demands of participants,
- Participants believe that the communication environment creates a sense of place.

Based on these six dimensions, we propose a Model of Cyber-Interactivity. Figure 1 illustrates the model and provides brief descriptions of the four types defined by the model. Based on this model, we provide a brief discussion of each of the six dimensions of interactivity.

Figure 1 – Model of Cyber-Interactivity


Inform
High
High
Goal
Control
Activity
Persuade
Low
Low
Rich Content
S
R
Virtual Community
P
P
Marketing Communication
S
R
Virtual Market
S
R
One Way
Direction
Two Way
Set
Time
Flexible
Low
Place
High

Rich Content: Online information and/or entertainment environments that provide searchable and/or playable content. May also include customized information resources such as personalized newspapers.

Virtual Community: Chat rooms, bulletin boards, and other environments where participants can b shared communication. Sender and receiver roles become indistinguishable a all communicators become participants.

Marketing Communication: Content created to promote a product or service, build a brand, or perform some other marketing communication function. Includes corporate Web sites, newsletters, online brochures, etc.

Virtual Market: Sites that facilitate online transactions. Transactions may be for the sale of products, solicitations for membership or donations, providing online customer support, etc.

S = Sender, R = Receiver, P = Participant (sender/receiver interchangeable)

## Goals

Interview respondents talked about ways in which organizations are using computer-mediated communication to advance their causes. For example, the same medium can be used to communicate a sales message and to transact the sale. But not all computer-mediated communication is designed to persuade. Rather, we view persuading and informing as two points on a continuum of communication goals. In some cases, communication goals are more oriented toward exchanging information. For example, Jake shared the experience of online collaboration that enabled a group of programmers to coordinate their work for a specific client.

Public relations practitioners have long recognized the fact that communication may be oriented to persuading and/or informing. In some ways, our Model of Cyber-Interactivity parallelthe Grunigs' four models of public relations.[31] For example, the marketing communication type closely parallels the press agentry model of public relations in that both use communication as a tool to persuade publics to adopt the organization's point of view. Similarly, the rich content type closely parallels the public information model of public relations in that both are based on communication goals of providing a wealth of information.

However, our Model of Cyber-Interactivity differs from the public relations model as it explores communication from participants' perspective rather than from the perspective of organizations who manage communication with publics. The Model of Cyber-Interactivity focuses on the actual interchange among communicators whereas the public relations model focuses on social, structural, and organizational factors that shape public relations behaviors. Furthermore, the Model of Cyber-Interactivity focuses exclusively on computer-mediated communication.

## Control

In interviews, some respondents framed control as an issue for the sender of a message and others saw it more from the perspective of the receiver. In both the marketing communication and virtual market types, the sender retains primary control leaving the receiver of the message little control over the communication experience. In the marketing communication type, receivers' actions are limited to simple selection as response to cues placed in the message by the sender. In the virtual market type the sender may customize products to meet the receiver's demands. But the sender still has the most to gain from the transaction. Even though two-way communication exists, there is a "prime sender" who is seeking feedback, hoping to make a sale, or in some other way benefiting from an exchange with receivers. Thus, the sender retains primary control.

In both the rich content and virtual community types, control shifts primarily to the receiver. In rich content, the receiver uses search tools, intelligent agents, or customized scripts to define what information he/or she wishes to view. In the virtual community type, all receivers are empowered. In fact, as illustrated in Figure 1 the sender and receiver roles become so interchangeable as to be indistinguishable. All communicators are participants – they both send and receive. And in both roles, they can exert a great deal of control.

## Activity

As noted earlier, the literature reflects mixed findings with regard to how much effort interactive communication requires. Upon reflection, we believe that the concept of activity may be more meaningful than the concept of effort. Our model incorporates Rafaeli's definition of interactivity as a way of conceptualizing varying degrees of activity. Rafaeli suggests that interactive communication requires all messages in a sequence to relate to each other. He implies that interactivity is a series of active and reactive communications which are all related.

Respondents seemed to be in general agreement that computer-mediated communication is more active than other forms of mediated communication. Pam said: "Just because you get at a computer and you start pushing buttons, or you get to jump from this site to that site, you've got some choice." Joseph spoke of individuals communicating through computers by saying: "They act by typing words or selecting things or moving things, or talking or a variety of things." But Rita suggested that this kind of active communication is a bit hollow: "Basically you cheat. You say I can give you five things to choose from but you are cheating because, these five things, you are controlling them in advance."

Reaction goes beyond the simple selection and choice of options presented by the computer (or the sender). Rather than just making choices, the individual can customize the content to suit his or her needs. Will said that the capability of customizing messages for individuals or groups was central to the notion of interactivity. Using the example of search engines, he pointed out that the individual should be able to "drive" the search engine and the search engine should respond. If the individual has conducted a particular kind of search in the past, the next time he returns to the search engine it will remember his searching patterns. "As it learns my preferences, it can then make suggestions to me," he said.

## Direction

It may seem that all interactive communication must be two-way communication. However, some forms of computer-mediated communication are much more like traditional one-way communication than others. For example, Web sites that provide online brochures for an organization might require user activity; the viewer may select options from a menu. But, this is not much different than turning the pages of a physical brochure. In both the Web site and the brochure, the communication is primarily one-way: from the sender to the receiver.

Most of our interview respondents assumed that interactive communication must be two-way. They talked about how the technologies inherent in the Internet allow for a robust feedback loop. And they also talked about how individuals can shift between sender and receiver roles. The literature also seems to assume two-way communication. Rafaeli's description of the recursive nature of interactivity assumes a two-way flow of communication. And both Rice and Rogers suggest that interactive communication requires that sender and receiver roles be interchangeable.

While it might be tempting to discount one-way communication as something less than full interactivity, to do so would fail to recognize some unique forms of communication that are evolving on the Internet. For example, the searchable databases of the rich content type are valuable forms of communication that do not have exact parallels outside of the "interactive" environment of media such as the Internet. These rich content sites typify a form of one-way communication in which the receiver exerts primary control over the message.

## Time

Timing, our data suggest, may be more important to some of the types of communication identified in Figure 1 than to others. For example, marketing communication and rich content seem to be based on the assumption that a sender creates a message at one point in time and a receiver retrieves it at another. The communication is set in a specific time.

By contrast both virtual market and virtual community types allow for time flexibility. As several interview respondents pointed out, tools such as e-mail allow them to achieve interpersonal communication without co-presence. So, the importance of timing seems to be its level of flexibility rather than its capacity for synchronous and/or asynchronous communication.

## Place

Our interviews suggested that some, but not all, types of computer-mediated communication may create a kind of "online environment" that provides communicators with a sense of place. Some of the factors that may help to create that sense of place include greater use of multiple types of media and a greater opportunity for interchanges among the participants. Throughout the interviews, as individuals talked about a sense of place, they seemed to be referring to situations that resembled either virtual markets or virtual communities.

For example, Joseph identified the Gap Kids Web site as one of the best "places" on the Web. He spoke of how the site enables the individual to physically participate in a shopping experience including "trying on" the clothes as one drags and drops specific clothing items onto virtual people. In an interesting twist on the concept of place, Jake first noted that one of the primary benefits of computer-mediated communication is that people don't have to be in the same place at the same time to be able to communicate effectively. But then he went on to note that tools such as e-mail, listservs, and bulletin boards can create a kind of "virtual place" where a virtual community can come together to collaboratively solve problems.

## DISCUSSION

Our exploration led us to a Model of Cyber-Interactivity. Following is a brief summary of the four types of interactive communication defined by that model and how each incorporates key dimensions of interactivity.

### Summary of the Model

The first type, *marketing communication*, is based on one-way communication from a sender to a receiver. The primary goal of the communication is to persuade the receiver to the sender's point of view. The receiver has very little control over the message and takes relatively simple actions to negotiate through the message. Timing of the message is relatively "set." Content availability is controlled by the schedule of the sender. These sites generally do little to create a sense of place. A typical example of marketing communication is the corporate Web site that does little more than present an electronic version of corporate brochures

The second type, *rich content*, is also one-way communication. But in this case, the receiver is the primary initiator of the communication. The sender creates messages, but the receiver exerts control over what he/she will view. The level of effort is greater than for marketing communication. Rather than simply selecting from a menu of choices, the receiver initiates a series of actions and reactions with the computer which results in retrieval of specific information requested by the receiver. The primary purpose of rich content is to inform or entertain rather than to persuade. Time is relatively set for this type as well. The receiver can not demand to see content until the sender has posted it. Individuals who use rich content sites are more likely to view them as information sources rather than as places where they go to interact. Typical examples include searchable databases and archived information. Online newspapers are also most often structured as rich content sites.

The third type, *virtual market*, utilizes two-way communication. But, because the control remains primarily with the sender, sender and receiver roles are never completely eliminated. The sender may try to reduce effort for the receiver by presenting a well-organized list of options from which the receiver can select. However, the primary purpose is to persuade the consumer to make some type of transaction. Virtual market transactions are sensitive to time in two ways. First, the closer to "real time" that communication occurs, the more likely that a transaction will be completed. Second, use of tools such as e-mail allow both sender and receiver to communicate effectively and efficiently without requiring that they be in the same time or space. Successful virtual market sites do create a sense of place. When they are oriented to sales, this place may resemble a retail outlet. When they are oriented to other types of transactions the type of place may be more like a customer support center, volunteer coordinator's office, etc. Typical examples include commerce-oriented Web sites and online customer support facilities.

The fourth type, *virtual community*, utilizes two-way communication. In fact, in this type, senders and receivers switch roles so frequently as to be indistinguishable. All participants retain some control over the communication and all must exert effort to stay current on the exchange of actions and reactions. The primary purpose of most virtual community communications is to exchange information and build understanding among participants. For example, mothers might exchange child care tips, professors might share teaching ideas, and public figures might exchange ideas with their constituencies on ways to improve community life. Virtual community allows for the flexibility of both real-time and time-shifted communication. Finally, participants often view these virtual communities as "places" where they can gather. Typical examples include chat rooms, bulletin boards, and newsgroups.

## Future Research

The research project described in this paper began with an examination of the literature on interactivity. From that literature, we identified key topics which we discussed with a panel of 10 people who both teach and work in the fields of emerging communication technology. Based on what we learned from these individuals, we have identified a Model of Cyber-Interactivity. Our next step is to test this model empirically.

First, we plan to identify a representative sample of Web sites that seem to typify marketing communication, rich content, virtual market, and virtual community. Then, we plan to design scales for each of the six dimensions used in defining interactivity. We will ask individuals to rank the selected sites using the interactivity scales. With a large enough sample of participants, we should be able to begin to make generalizations about the dimensions of interactivity and their usefulness in defining the Model of Cyber-Interactivity.

## APPENDIX 1

### Interview Instrument

*I'm interested in your thoughts on issues related to the concept of interactivity and computers. The information I'm gathering, over the next few minutes, from talking to experts (such as you) will help me – and I hope will help others – to better understand the impact of new technologies. I'm tape recording our conversation so, in the weeks ahead, I can refer to the tape, and, in turn, take some notes off of it. Just answer the questions with whatever comes to mind; feel free, too, to "pass" on any questions.*

*The information gathered from this interview and others will be used in order to write an academic paper; it's not intended for any purpose other than that. At the conclusion of interviews such as these I always destroy the tapes and, therefore, can assure your answers will remain confidential. How's that sound? Any questions?*

1. What does the concept of "interactivity" mean to you?

2. How much effort, relative to that expended for other types of communication, do you think interactive communication requires?

3. One of my colleagues recently suggested to me that fully interactive media create a situation in which the roles of the sender and receiver are interchangeable. What do you think of that idea?

4. How important do you think it is for interactive communication to occur in "real time?" In other words, is it necessary for responses – in order to be deemed "interactive responses" – to be immediate?

5. Someone recently said, and I'll paraphrase, that "interactivity is a quality of individuals who are making use of a medium, rather than being a quality of a medium itself." How would you respond to this?

6. Some kinds of communication give the communicator more control than others. For example, a public relations practitioner does not have complete control over how a reporter will cover a press conference, whereas an advertising professional has control over what an advertisement will look like. Tell me what you think about the issue of "control" as it applies to interactive communication?

7. How important is it to track the activity of people who are participating in interactive media?

8. What do you see as the advantages and disadvantages of different forms of interactive communication?

9. A communications professional recently said to me that she sees interactivity as "threatening." How would you respond to her?

10. Finally, thank you for your willingness to share your ideas on these topics. Can you tell me if there are any major, related, issues we didn't address above. What have we missed?

## APPENDIX 2

### Profile of Respondents

**Joseph** gained substantial experience as both an educator and executive for one of the nation's leading computer firms. He serves on the full time faculty at one of the country's top communication programs.

**Pam** recently published a book on the uses of new technologies and has an extensive background in media research, theory, and computer-assisted instruction and design.

**Dennis** has extensive professional and academic experience, primarily in the advertising industry. He teaches a variety of courses on interactive communication while serving on the full time faculty at a prominent southern university.

**Bob** directs a technology task force for one of the nation's leading communication programs. He concentrates on the integration of new technology, such as interactive multimedia, into the university's programs.

**Jake** has served as an instructor for the past 15 years at a prominent research and technology university. He has worked extensively in the ongoing development of his institution's computer courses and played a significant role in shaping the related curriculum.

**Kent** manages content development for a large student-oriented Web site. He also manages the university students who are responsible for creation of the content.

**Will** has post-graduate training in computer science with an emphasis in artificial intelligence. He currently teaches university students the technical aspects of building sophisticated Web sites.

**Rita** works professionally as a multimedia-media designer. She has experience as a journalist, film maker, and artist. She teaches university students the basics of using computers as a tool for communication.

**Amy** works for a company that specializes in facilitating collaborative workplace strategies. She has post-graduate education in philosophy and is also active in creating several "virtual communities" oriented to support of professional women.

**Jeff** is a recently-retired journalist whose computer experience began with mainframes in the 1960s, progressed to minicomputers in the 1970s, and evolved to microcomputers in the 1980s. He currently uses e-mail extensively in his teaching of university writing courses.

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# Computerization of Taiwanese Newspapers

by

Li-jing Arthur Chang

Lecturer
School of Communication Studies
Nanyang Technological University
Nanyang Avenue
Singapore 639798
(65)799-5773
tljchang@ntu.com.sg

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## Abstract

This study attempts to describe the adoption of computer technology by the Taiwanese newspapers and explain the adoption process with the diffusion of innovations theory. Findings showed that the adoption process can be explained using the three perceived attributes under the theory: (1) the perceived relative advantage of an innovation over the old idea, (2) its compatibility with existing values and needs of potential clients, and (3) its complexity in use and understanding.

## Introduction

Computers are one of the latest technological innovations to sweep the deadline-conscious newspaper industry. In the United States, computers appeared in the 1960s to automate the processing of news copy [1].

Word-processing computers have been embraced by newspapers to reduce operating costs [2], including time and money. Specifically, with computers edited stories can be sent directly to typesetting machines in the composing room. This eliminates the trouble of re-keyboarding the same text matter. The net results are a saving of time along with cost reduction, which can be achieved through cutting typesetting jobs.

The importance of this lies in two aspects. First, the time saved will allow more late-breaking news to go through [3], which would make a newspaper more timely and thus more desirable to the reader. Also, cost reduction will increase profit margins for a newspaper.

Computerization improves other newspaper operations as well. After nearly three decades of development, computers in newspapers can perform a variety of functions, including pagination, processing classified ads, creation of easily accessible data bases, accounting, circulation, payroll calculation, etc.

With interfaces, almost all of these operations can be integrated [4]. Such integration have changed communication methods between computers at different departments from paper work to wires, not only increasing speed but also avoiding paper waste.

Viewing the success of their U.S. counterparts, Taiwanese newspapers have moved toward computerization. However, computerization came to Taiwan two decades after it swept the United States, with the United Daily News (Taipei, 1989 circulation: 1 million) taking the first step in 1981 [5].

In 1989 (after eight years of development), computer equipment at the News, one of Taiwan's two biggest papers [6], was only able to perform the typesetting function. Software for pagination and classified ads was still under development [7]. Also, facilities allowing reporters to key stories directly into the computers were unavailable and most newsroom personnel lack proper training to operate such equipment.

One brake on computerization for Taiwanese newspapers has been the language--Chinese. The written form of the language consists of ideographic characters; the newspaper language has at least 6,000 commonly used characters. The full range of characters, including those seldom used, runs to more than 10,000. Because of the complexity of the language, development of software capable of processing the language lagged behind development of computer programs in English. Neither newspapers in the

People's Republic of China nor Chinese-language newspapers in the United States had developed computer programs using traditional Chinese characters by the summer of 1989 [8]. Papers in the People's Republic of China use simplified Chinese characters, as late Communist Party Chairman Mao Tse-tung dictated. However, Chinese-language papers elsewhere use the traditional characters.

This study addresses the relatively more complicated automation of the Chinese-language newspapers in Taiwan.

### Purposes of the Study

The purposes of the study are to find the extent of computer use, problems with adoption as well as benefits of automation at the 28 Chinese-language dailies in Taiwan [9]. It also attempts to explain computer adoption using the theory of diffusion of innovations [10].

To fulfill the purposes, all 28 Taiwanese newspapers were surveyed to obtain information about time, expense, reasons, problems and other details related to the computerization of the Taiwanese press.

### Rationale of the Study

This study is important because the Taiwanese press is the pioneer of computerization in the Chinese-language press [11]. The experience of Taiwanese newspapers may be helpful to Chinese-language newspapers in other regions that plan to adopt the technology in the future.

Also, the study is significant because there are about 26 million Chinese living in areas where traditional Chinese characters are used. In addition, many of the billion Chinese in the People's Republic of China probably retain interest in their traditional written language [12]. Needless to say, they represent a market of huge potential.

## Literature Review

Besides describing the benefits, problems and main features associated with the automation of the Chinese-language press in Taiwan, this study also attempts to explain the adoption of such technology using the diffusion of innovations theory.

The theory, which has received a lot of interest since its introduction [13], defines diffusion as the process by which an innovation is communicated through certain channels over time among the members of a social system [14].

To illustrate the theory, this study uses examples comparable to the Taiwanese adoption experience--the diffusion of automation in U.S. newspapers.

For the sake of clarity, the illustration concentrates on two important research questions addressed by diffusion scholars. They are as follows:

(1) How do the earlier adopters differ from the later adopters of an innovation?

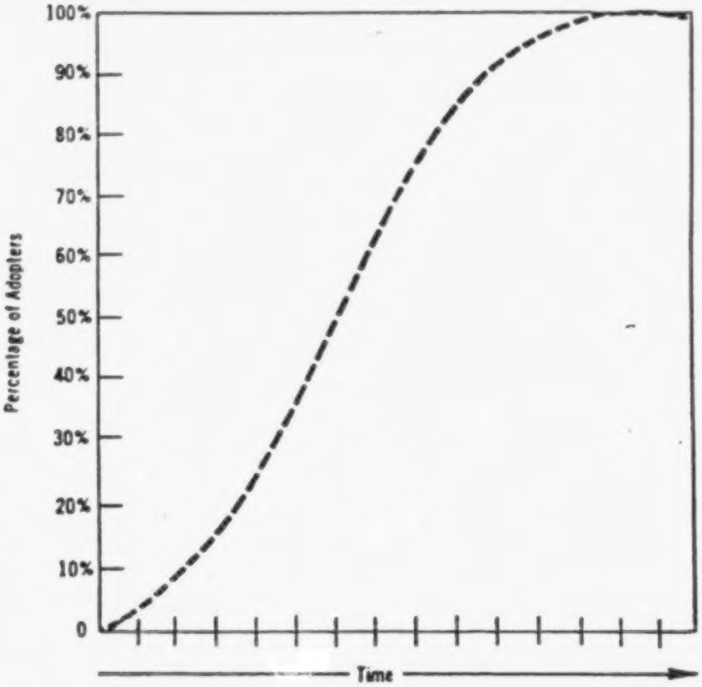
(2) How do the perceived attributes of an innovation, such as its relative advantage, compatibility, complexity, etc., affect its rate of adoption [15]?

### Early Adopters

Past studies have generalized that early adopters usually have larger-sized units (farms, etc.) than later adopters and must be wealthy enough to absorb the loss from failure in adoption [16].

**Figure 1.**

**Adoption of Innovation Curve** [17]



Take the computerization of U.S. newspapers, for example. Generally, the greater the circulation size of newspapers the earlier the adoption of computer technology [18]. In 1970, a decade after computers were first introduced in a U.S. newspaper, not one newspaper with a circulation of 10,000 or less had used a computer for more than five years. By comparison, among newspapers of 500,001 circulation or more, only about one-third had used computers for less than five years [19].

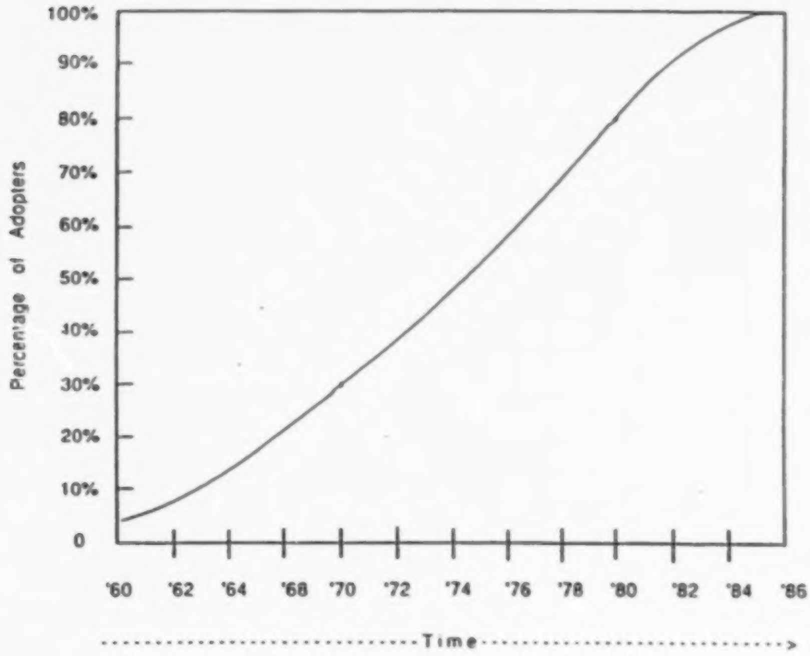
Another generalization about early adopters is that they are wealthier than later adopters [20]. The statement seems true with regard to newspapers because larger papers probably have to have more money to pay for larger production and distribution costs.

After a few early adopters, the number of adopters first increases at an accelerating rate but winds up at a diminishing tempo [21]. If the cumulative number of adopters is plotted, the result is an S-shaped curve (see Figure 1).

The S-shaped curve can be used to describe the cumulative adopters of newspaper computers in the United States between 1960 and 1985 [22].

**Figure 2.**

**U.S. Newspaper Computer-Adoption Curve 1960-1985**



Perceived Attributes of an Innovation

Other than for generalizations about the quality of early adopters and the "S" adoption curve, there are other perceived attributes of an innovation that can be used to explain the past adoption rate and predict the rate in the future [23].

Generalizations about attributes such as the relative advantage of (an innovation) or (its) compatibility (with existing values and adopter needs) have been derived from past research. These generalizations can be used to predict the rate of adoption for innovations in the future [24]. In addition, both attributes and a third one--the complexity of an innovation--can be applied to explain the adoption rate in the past.

In general, the relative advantage of an innovation (over the idea it supersedes), as perceived by members of a social system, is positively related to its rate of adoption [25]. The same rule is applicable to the rate of adoption and the perceived compatibility of an innovation with the needs of adopters [26]. On the contrary, the perceived complexity of an innovation is negatively related to its rate of adoption. Definitions of these three attributes and generalizations about their relationship with the rate of adoption will be further discussed later in the paper. The experience of U.S. newspapers toward computerization will be used as examples in the discussion.

## Relative Advantage of an Innovation

The relative advantage of an innovation is the degree to which such an innovation is perceived as better than the idea it supersedes [27].

Taking the case of U.S. newspapers adopting newsroom computers, for example, the perceived advantages of the innovation are the savings of time and money and the raising of productivity. Compared with pre-computer equipment, computers raise the speed of processing news copy by avoiding re-keying the text matter. Edited copy is sent electronically to computers in the composing room. As a result, not only is time saved, but typesetting jobs are also eliminated. The first result raises productivity while the latter reduces operation costs.

The relative advantage of computer innovation in time and money savings also can be achieved by computers in the news department. The computers generally function through two systems: video display terminals (VDTs) and optical character recognition equipment (OCRs), which are linked directly to the central processing unit. Using these terminals (VDTs or OCRs) instead of the pre-computer era typewriter, reporters no longer have to submit personally typewritten stories to editors. They simply have to push a button to send completed stories in the system's memory. Editors can, instead of editing the stories long hand as they did before computerization, recall the story through a VDT to edit it [28].

Time is not the only savings created by the simplification of the operating process; editing costs are also saved. For instance, the managing editor at Florida's Daytona Beach Journal and News said in 1972 that computers saved about $70,000 a year by eliminating a galley of proof correction operations everyday [29].

Through word of mouth, media publications and promotions of computer suppliers, the relative advantage in time and money savings probably have been easily perceived by newspaper publishers and editors. Based on the generalization that the relative advantage of an innovation is positively related to the rate of adoption, the rate at which newspapers adopted computers should grow yearly. A proof of such growth can be observed by examining figure 2. Two decades after newspapers first adopted computers in 1960, the relative advantages of savings in time and money have been reinforced by increasingly versatile computer functions, especially those of personal computers (PCs). The PC has its advantage over old, non-programmable terminals because it can be programmed to have a variety of features [30]. The features include personal and clerical functions, the ability to perform some newsroom and pre-press operations, and the assumption of formerly time-consuming library, darkroom, circulation and promotion tasks [31]. For small newspapers and weeklies, the perceived advantage of PCs is versatility and cost-efficiency [32].

As the perception of the relative advantages is widespread [33], the rate of adoption increases accordingly. One proof is the fact that the number of computers used by daily newspapers in the United States increased from an estimated 60,000 in 1983 to approximately 100,000 in 1989 [34].

### Compatibility of an Innovation

Compatibility is the degree to which an innovation is perceived as consistent with the existing values and needs of potential adopters [35].

The experience of the U.S. newspapers' adopting computer technology will be introduced in this section to illustrate the computer's compatibility with the existing values and needs of potential adopters as well as its relationship with the rate of adoption.

In terms of existing values among newspapers, the savings of time brought by computerization is compatible with the traditional value of timeliness held by the newspaper industry [36].

Time saved through computerization can allow newspapers to include more timely news, a value developed through competition and the notion that the audience wants and needs its news as quickly as possible [37].

Because, in general, compatibility is positively related to the rate of adoption, it can be inferred that there should be a continuous growth of computer use through the years. This inference can be proved by examining figure 2.

Another aspect of compatibility--the relationship between the needs of potential clients and the innovation--can also be illustrated by the examples of U.S. newspaper computerization.

For instance, pagination can meet the need to cut paste-up jobs in composing rooms because the device can assemble the pages electronically. The need was well-described by the publisher at the Pasadena Star-News [38]:

> The basic motivation was economics. We are in a highly competitive market with continual need to contain costs. Our system eliminated the composing room and saved us a net of 23 employees at an average annual (per person) labor cost of $29,000.

This means that the newspaper saved $667,000 a year through eliminating composing room.

In addition, pagination also meets editors' needs to be more creative and flexible in making over pages from edition to edition [39].

As pagination is compatible with the needs of editors and publishers, it can be inferred that the rate of adopting the device must be high. In fact, pagination has accelerated the revolution introduced by VDTs [40]. A design feature related to pagination--page layout of color graphics--also received widespread popularity. By the late 1980s, many newspapers used the Apple Macintosh and a laser printer to produce color information graphics [41].

## Complexity of an Innovation

Complexity is the degree to which an innovation is perceived as relatively difficult to understand and use. And unlike relative advantages and compatibility, which could be positive factors in the adoption of new technology, complexity of an innovation is negatively related to the rate of adoption.

When U.S. newspapers began to use computers, probably the biggest problem in converting was the union resistance. As management wanted to cut jobs, the unions stood up for their members facing the threat of unemployment and opposed computerization in newspapers.

However, the complexity did not stop the diffusion of computer technology in newspapers. One reason is that many newspapers have managed to keep layoffs at a minimum through attrition policies and absorbing personnel in other job areas [42]. Obviously, these measures can help newspapers avoid union hostility.

Another probable reason for the diffusion of computer innovation to outlast union resistance lies in the fact that the advantages of the innovation and its compatibility with newspaper practice had greater impact in the business than did labor strikes [43].

A second complicating problem is the interfacing of equipment made by a variety of manufacturers. Because there is no universal standard for computers designed by different companies, it is difficult for them to communicate with each other. This creates problems because once a newspaper adopts a brand, it has to continuously buy products made by the same company or the new equipment will be able to interact with the old machines only with great difficulty. This problem could explain why in the 1960s, 1970s and early 1980s, it was typically newspapers of larger circulation that adopted computers earlier--because only the larger newspapers could afford the mistake of purchasing the wrong equipment [44].

The problems, however, were resolved by the late 1980s, when less expensive PCs became available to perform the same functions as the conventional dumb terminals and CPUs [45]. Also, interfaces and protocols have been developed to help various brands of equipment to communicate [46]. As these complicating problems diminish, the rate of adoption should increase accordingly. One statistic confirming this hypothesis is that the number of computers used by newspapers exploded from the 1983 figure of 60,000 to 100,000 in 1989 in the United States [47].

In sum, the most commonly addressed research questions in the diffusion studies are: (1) How do the earlier adopters differ from the later adopters of an innovation? (2) How do the perceived attributes of an innovation, such as its relative advantage, compatibility, complexity, etc., affect its rate of adoption?

Earlier adopters generally have larger units (farms, etc.) and often are wealthier and can afford the costs of failure in adoption. The earlier adopters are few. After them, the number of adopters first increases at an accelerating rate but winds up at a diminishing tempo. If the cumulative number of adopters is plotted, the result is an S-shaped curve.

Past diffusion process can be explained by examining the perceived attributes of an innovation such as its relative advantage over the old idea, its compatibility with existing values and adopter needs, and its complexity in use.

The relative advantage of an innovation is the degree to which such an innovation is perceived as better than the idea it supersedes. It is positively related to the rate of adoption.

Compatibility is the degree to which an innovation is perceived as consistent with the existing values and needs of potential adopters. It is also positively related to the rate of adoption.

Complexity is the degree to which an innovation is perceived as relatively difficult to understand and use. And unlike relative advantages and compatibility, it is negatively related to the rate of adoption.

## Method

The goals of this thesis are to describe the degree to which newspapers in Taiwan have adopted computer technology, and to explain the adoption process through the diffusion of innovations theory. These goals required the researcher to gather data from Taiwan newspapers.

Although the author, through working at one newspaper and having direct contact with another [48], had general knowledge of computer use in Taiwanese newspapers, the goals of the study dictated that data be gathered scientifically.

The author interviewed two newspaper executives during a visit to Taiwan and used information gained in those interviews as well as information from the literature review to design a survey questionnaire.

### Data-gathering Tool

A survey was deemed the appropriate tool for gathering data because it can provide both descriptive and analytic material [49].

Since one of the goals of the study was to describe the adoption process within the framework of the diffusion theory, the survey questionnaire called for details on what equipment was purchased or developed, dates of purchase, origin of the technology, problems with utilization, etc.

### Survey Population

One decision a researcher must make in planning a survey is what audience to address and how large the sample must be to answer research questions. This study is concerned with a specific population--28 Chinese-language newspapers in Taiwan. While a larger population could have been addressed--for example, all Chinese-language newspapers--circumstances worked against such a choice. First, newspapers in China (P.R.C.) don't use traditional Chinese characters; computerizing newspapers in the P.R.C., therefore, has not been linked to computerization in Taiwan. Related to this is that the Communist economy of the P.R.C. does not respond to the same forces as the capitalistic economy of Taiwan. Therefore, exclusion of P.R.C.-based newspapers was necessary.

While inclusion of newspapers in some other Chinese-language centers such as Hongkong and Singapore was viewed as desirable for comparative purposes, such data were not available. None of the 18 questionnaires mailed outside Taiwan were returned [50].

### Distribution and Collection of the Questionnaire

The questionnaire, along with a cover letter, was sent to the author's associate at the Taiwan Daily News, where the Chinese version was printed.

Both versions of the questionnaire were mailed to the editors at the 28 newspapers, and the author's associate telephoned to remind those who failed to respond.

The questionnaires were mailed from Taipei during the week of March 19-25, 1989. Within two weeks, 22 newspapers had returned the questionnaire. Follow-up telephone calls in the following five weeks resulted in the return of surveys from four more newspapers. The final results show 26 of the total 28 Chinese-language dailies in the nation had returned the questionnaires.

### Presentation and Analysis of Data

Survey responses were translated into English and data were either input into the computer or arranged by frequency by hand. Early adopters--defined as those who began using computers before the 1970s--were studied to determine if they fit the theoretical model and whether the rate of adoption mirrored the U.S. example.

In addition, data describing the Taiwan picture--cost, origin of equipment and other salient features--were collected from the questionnaires for table and graphic displays.

## Results

In this section the survey results were presented in tables created with the help of the computer program SPSS [51]. The study addresses computer use in the newsroom and its application in the business end of the newspaper.

Of the 28 Chinese-language newspapers surveyed, 26 responded. Because half of those that answered belong to five companies, the actual analytical units are the 18 newspaper companies instead of the 26 individual dailies [52].

The results presented and interpreted include the following categories: (1) specific years when newspaper companies adopted computers; (2) the reasons for adopting the technology; (3) the reasons for not adopting the technology; (4) whether computerization saves time; (5) the improvement in word-processing speed; (6) whether the equipment is on-line; (7) the current facilities and their cost; (8) whether automation saves money and the amount of annual savings; (9) labor problems; (10) other problems associated with adopting the technology; (11) the training of employees; and (12) the presence and types of backup systems.

**Table 1. Circulation and Time of Adoption:** Each cell shows the number of newspapers with a certain circulation that adopted computer technology in a given year.

| Circulation | 1981 | 1985 | 1987 | 1988 | 1989 |
|---|---|---|---|---|---|
| 1 to 129,999 | | | | 2 | |
| 125,000 to 249,999 | | | | 2 | |
| 250,000 to 499,999 | | 1 | 3 | 2 | 1 |
| 500,000 to 749,999 | | 1 | | 1 | |
| 750,000 to 999,999 | | | | 1 | |
| 1 million to 1.49 million | | | | | |
| 1.50 million to 2 million | 1 | | | | |

Time of Adoption

It was found that among the 18 newspaper companies, 15 have adopted computers. Generally, the larger a company's circulation size, the earlier it adopted the technology.

The relationship between circulation size and time of adoption can be found by examining table 1. Before 1988, six of the 18 newspaper companies that had adopted the technology had circulation exceeding 249,999. And while all of those whose circulation was above 250,000 had been computerized by May 1989, three with distribution sizes below 124,999 have not taken a step toward computerization.

Reason for Adoption

Increasing word-processing speed [53] and cost cutting were the most commonly cited motivations for adopting computer technology.

Of the 15 newspaper groups that use computers, 13 believe that the promise of greater speed in the newsroom prompted them to automate. Twelve noted that cost reduction was the primary consideration for computerization.

Two less-cited reasons were improving the newspaper's printing quality and lessening workers' exposure to exhausts during the type remolding process [54]. Each was cited by three groups.

The least-cited reasons were heralding in a new epoch in press computerization history, joining the newspaper automation trend, facilitating personnel management and processing files in the business departments.

## Reasons for Non-adoption

Of the 18 newspaper companies, three have not been computerized, and two of the three are not planning to move in that direction.

The two companies, the Kinmen Daily News and Matsu Daily News, cited their small circulation, their limited number of pages and budgetary constraints to explain why they do not plan computerization. They also provided details about their situations.

In terms of circulation, the two companies said separately in surveys that each of them has a circulation of less than 100,000. They noted that because manual typesetting is fast enough to print that many copies in time, there is no need to spend a lot of money installing computers.

As to limitations in page numbers, the two responded that each of their papers only have six pages. They believe that because the speed of manual typesetting is sufficient to meet deadline needs, it seems unnecessary to invest a lot of capital to automate their newspapers.

About budgetary constraints, both companies said they are located on small islands without many advertisers to support their businesses. Therefore, it could be risky to install expensive computers.

**Table 2. Time Saved through Computerization:** Of the 15 newspaper companies that had been computerized, 13 said the computers have saved them time. Of the 13, 10 gave actual amount of time gained daily through computerization. The following is a table showing the number of companies that saved time and how much time each saved.

| Daily Time Gains | 30 minutes | 45 minutes | 50 minutes | 80 minutes | 120 minutes |
|---|---|---|---|---|---|
| Number of Papers | 2 | 1 | 2 | 2 | 3 |

## The Computer as a Time-Saving Device

Time was the most frequently cited reason for automation and is apparently the major concern for the newspaper business. Of the 15 newspaper companies computerized, 12 said the new equipment has saved them time.

However, the amount of time saved varies among the companies. Most of them said they gained from 30 to 80 minutes in deadline as a result of computerization (see table 2).

In terms of hourly word-processing capacity, 13 of the 15 computerized companies said their typesetters can handle two to three times more words per hour compared with what they could in pre-computer era. In addition, a fourteenth computerized paper, the Liberty Times, reported that its hourly typesetting capacity increased nearly six times [55].

### Presence of On-line Equipment

Although speed increase was cited by most newspaper companies as the primary consideration for automation, 11 of the 15 computerized newspaper companies do not have on-line equipment to further accelerate the word-processing process. Without on-line equipment that enables different computers to talk to one another via telephone wires, communication between computers has to be done by disks transported by hands. This shortcoming means that the equipment now in use at these 11 newspaper companies is unable to live up to its speed potential.

**Table 3. Circulation and On-line Equipment:** This table shows the relationship between possession of on-line equipment and circulation among the 15 computerized newspaper companies in Taiwan.

| Circulation of Newspaper Companies | Number of Newspaper Companies Having On-line Computers | Newspaper Companies Without On-line Computers |
|---|---|---|
| 1 to 124,999 | | 1 |
| 125,000 to 249,999 | | 2 |
| 250,000 to 499,999 | 1 | 6 |
| 500,000 to 749,999 | 1 | 1 |
| 750,000 to 999,999 | | |
| 1 million to 1.49 million | | 1 |
| 1.5 million to 2 million | 1 | |

The larger newspaper companies do have a higher incidence of on-line equipment. The three with such facilities all have daily circulation larger than 250,000 (see table 3).

### Facilities in Use and Their Costs

On-line or not, the computers in the 15 computerized newspaper companies were bought only with the idea of processing news copy. Many newspapers bought them with the idea of streamlining business operations.

As for other applications in the publishing area, eight newspaper companies have computers able to process classified advertising. In addition, three companies have automated the publications of books and journals.

In terms of equipment locations, 11 newspapers said their word-processing facilities are installed in the composing room. Less-common installation places are the newsroom as well as a room next to the editorial department; each of those was cited by three newspaper companies. Only two companies said they have computers in an independent room.

On the business side, four newspaper companies have computerized their finance operations while the same number of companies use computers to handle distribution data. Also, three companies have adopted automation of personnel payroll data processing. Finally, two of those surveyed said their equipment can calculate advertising revenues.

Most of the business-oriented computers are installed in finance, personnel and distribution departments, each cited by three newspaper groups. Two surveyed said they have computerized their advertising departments.

Despite those uses, most computers in the 15 newspaper companies are primarily designed for word-processing purposes rather than business operations.

Twelve of the 15 computerized newspaper companies said they bought their word-processing computers as a package. Only two said they developed their own equipment.

Japanese manufacturers are the biggest sellers to the 12 companies that bought their word-processing equipment. Specifically, nine of the 12 purchased their hardware from Japan while eight of them use Japanese-developed software (programs).

Other contenders in the market include hardware manufactured by Britain, Taiwan and the United States, each used by two newspapers. Software produced in Taiwan also was installed at two dailies.

**Table 4. CPU Brands and Their Nations of Origin:** Of the 15 computerized newspaper companies, 12 said they purchased their equipment from computer makers. Eleven of the 12 provided information about the brand of their equipment.

| Brand name (Nation of Origin) | Sazanna (Japan) | Morisawa (Japan) | Kobishi (Japan) | Appollo (U.S.A.) | Linotype (U.S.A.) | Monotype (Britain) |
|---|---|---|---|---|---|---|
| Number of Papers Buying It | 6 | 1 | 1 | 1 | 1 | 1 |

In terms of individual brands, Japan-based Shaken Co.'s Sazanna hardware ranked first in sales among the Japanese computer makers. Terminals and central processing units (CPUs) made by this company are used by six of the newspaper companies. To provide a clear example of the market, a breakdown of all CPU brands in use by the Taiwanese press and their nations of origin is shown in table 4.

**Table 5. Circulation and Costs to Buy Computers:** Each cell shows the number of papers with a certain circulation that purchased their equipment at a specific price.

| Cost<br>Circulation | $0.6 million | $1 million | $1.2 million | $1.5 million | $2 million | $2.2 million | $3 million | $4 million |
|---|---|---|---|---|---|---|---|---|
| 1 to124,999 | | | | | | | | 1 |
| 125,000 to 249,999 | 1 | 1 | | | | | | |
| 250,000 to 499,999 | | 1 | 1 | 2 | | | | 2 |
| 500,000 to 749,999 | | | | | | 1 | 1 | |
| 750,000 to 999,999 | | | | | | | | |
| 1 million to 1.49 million | | | | | 1 | | | |
| 1.5 million to 2 million | | | | | | | | |

The costs of the equipment varies, ranging from $600,000 to $4 million. In general, the bigger the circulation is, the more a newspaper company has to spend to buy computer equipment (see table 5).

For the two newspaper companies that developed their own computer equipment, the United Daily News Group and Liberty Times, larger distribution also means more capital investment in automation. With a combined circulation of two million, the News Group spent 5 million in development. In contrast, the cost to develop computers was only $150,000 for the Times, which has a much smaller circulation of 320,000.

**Table 6. Annual Savings from Computerization:** Among the 15 computerized newspaper companies, 13 said they saved money through computerization. Of the 13, eight provided actual figures on how much money they saved annually. Each cell shows the number of companies with a certain amount of savings.

| $0.1 million | $0.2 million | $0.24 million | $0.5 million | $0.8 million | $1.1 million | $3.7 million |
|---|---|---|---|---|---|---|
| 1 | 2 | 1 | 1 | 1 | 1 | 1 |

## Computerization as a Money-Saving Measure

In contrast with the astronomical spending associated with computerization is the equally amazing savings that results from the the technology.

Fourteen of the 15 computerized newspaper companies said that automation saved them money [56]. For the eight companies that revealed the amount of saving, the money saved annually ranges from $100,000 to $3.7 million (see table 6).

The primary money saver that comes from computerization is a reduction in the number of jobs in the composing room, a method used by 12 of the 15 computerized newspaper companies. Other means consisted of higher management efficiency and faster distribution. Each method was cited by one newspaper company. In addition, one company said it increases its revenue by improving its newspaper printing quality to draw more readers.

Reduction of composing room jobs took place in 14 of the 15 computerized newspaper groups. Although the reduction rate ranges from 10 percent to 80 percent, half of the 14 had a rate between 40 and 60 percent.

## Labor Problems

The job reduction posed labor problems for only four newspaper companies. Part of the reason, according to some companies, is due to the policy of transferring some laid-off employees to other departments while asking others to leave voluntarily with compensation, retirement pensions or other benefits.

Another reason, according to Chia-hsiang Chang, general manager of Taiwan Daily News, was that most workers at the newspaper business understood that they would not benefit from an overt resistance against newspaper owners. Chang said there is an unspoken understanding between workers and publishers that the best way to solve problems is through compromising. As a result, other than an aborted strike in China Times last year, there have not been any strikes launched by newspaper labor unions yet, which is atypical among unions in Taiwan [57].

The few labor problems mentioned consisted of passive worker resistance, the amount of layoff benefits and troubles from attempts to transfer some jobs and efforts to ask workers to leave voluntarily.

Several newspaper companies have described the labor problems they confronted. The Central Daily News said that although it had been willing to give pensions and job transfers, the offers from the paper sometimes could not meet demands of labor. The Taiwan Daily News said in the survey that some typesetters, facing layoff, had intentionally delayed work to passively protest the job reduction-measure. Most of the newspaper companies deemed transferring laid-off employees to other departments as a way to avoid firing typesetters and the possible effects on labor.

Almost all (14) of the 15 computerized newspaper groups said a layoff fee is necessary, as required by the Labor Standards Law in Taiwan [58].

### Other Problems During Computerization

Besides difficulties in job reduction, insufficient training to operate new equipment is the biggest problem during computerization of the Taiwanese press. Four of the 15 computerized newspaper companies said more training is necessary for newsroom and composing room staff to be familiar with the processing of news copy. In addition, one company underscored the importance of training by noting some typesetting workers may need mental adjustment because of difficulties conforming with new jobs.

Also, updating and expansion of the equipment was viewed as a problem by two newspaper companies. Because there is no universal standard for computers of different brands to communicate with one another, newspapers must determine if interfaces or protocols are available to integrate the planned facilities with old systems, the companies noted.

However, without further renovation, the slow speed of current equipment could also mean trouble. Two of the 15 computerized newspaper companies said their computers cannot meet urgent needs in the processing of news copy.

Other problems noted by the newspaper companies are a shortage of characters available in a computer's memory, the inability of current equipment to improve newsroom efficiency, typesetters' difficulties reading reporters' cursive handwriting as well as journalism school graduates who were unable to type Chinese characters into computer.

The newspapers that addressed these problems also gave detailed descriptions. The China Time group said in the returned survey that due to complexity in keying in Chinese characters, present computer equipment was only designed for use in the composing room, thus unable to improve newsroom efficiency. In addition, the questionnaire filled by the Taiwan Daily News indicated that because the reporters are still writing stories by hand for input in the composing room, cursive handwriting adds difficulties for typesetting and could slow down news-processing speed. Finally, the Min Chung Daily News pointed out that journalism schools in Taiwan have not met the newspaper computerization trend by including instruction on how to write stories with computers.

### Training of Employees

Thirteen of the 15 computerized newspaper companies said their reporters cannot write stories directly into the computers. Instead, their handwritten drafts are edited, then sent to composing room to be input by typesetters.

The two most important reasons for reporters' inability to input their own stories are the complexity of the characters and the lack of facilities for such inputting purposes. Each of these reasons is noted by seven newspaper companies. In addition, one company said a third reason might be that most adults in Taiwan do not know how to type and have little opportunity to learn. Therefore the notion of entering Chinese characters into a computer via the keyboard is totally foreign.

**Table 7. Length of Training Reporter to Use Terminals:** Of the 15 computerized newspaper companies, seven said they are going to train reporters to input stories in terminals. The cells show the numbers of newspapers planning to offer training for specific periods of time.

| Length of Training | 1 month | 2 months | 3-6 months | 6-12 months | 12 months |
|---|---|---|---|---|---|
| Number of Newspapers | 1 | 1 | 2 | 1 | 2 |

**Table 8. Circulation and Incentives for Self-training:** Of the 15 computerized newspapers, five said they are going to provide incentives for reporters to train themselves to use terminals. All of the five have circulation larger than 250,000, as shown in the cells.

| Incentives<br>Circulation | Available | Unavailable |
|---|---|---|
| 1 to 129,999 | | 1 |
| 125,000 to 249,999 | | 2 |
| 250,000 to 499,999 | 3 | 4 |
| 500,000 to 749,999 | 1 | |
| 750,000 to 999,999 | | |
| 1 million to 1.49 million | | 1 |
| 1.59 million to 2 million | 1 | |

However, 13 of the 15 computerized newspaper companies have decided to improve the situation by training reporters to use Chinese-language word-processing software.

According to details revealed by seven of the 13 companies, although they generally plan to train half of their reporters, the length of such on-the-job education varies; the longest training period is expected to last 12 months while the shortest period lasts only a month (see table 7).

Among the 13 newspapers companies that plan to provide the training, five of them also offer incentives for reporters to learn word-processing programs. These five companies are also those with larger circulation (see table 8). The most popular incentive is monetary awards, adopted by four of the five companies. Other encouragement consists of job promotion, credits, moral support and personal computer giveaways.

**Table 9. Circulation and Types of Backup Systems:** Of the 15 computerized newspaper companies, seven said they have backup systems. Those having computers as backup systems are bigger companies, with circulation larger than 250,000. The cells show the number of newspapers falling into specific categories.

| Backup system<br>Circulation | Second Independent Computer | Built-in System | Pre-Computer Equipment |
|---|---|---|---|
| 1 to 129999 | | | 1 |
| 125000 to 249999 | 1 | | |
| 250000 to 499999 | 1 | 1 | 1 |
| 500000 to 749999 | 1 | | |
| 750000 to 999999 | | | |
| 1 million to 1.49 million | | | |
| 1.5 million to 2 million | 1 | | |

Presence and Types of Backup Systems

Although all efforts to train employees to use computers will become futile if the computers break down, less than half (seven) of the 15 computerized newspaper groups have a backup system to deal with such an occasion.

The newspaper companies that use pre-computer equipment as backup are generally the smaller-sized newspapers, which have circulation lower than 499,999. In contrast, the companies having a second computer system or a built-in system generally have larger circulation sizes (see table 9).

## Analysis

The analysis of results concentrates on the explanations of the diffusion of computers in the 18 Chinese-language newspaper companies in Taiwan.

The explanations will be based on the following generalizations discussed earlier. They are:

(1) Early adopters are richer and have larger sizes or units (farms, etc.).

(2) If the cumulative number of adopters is plotted, the result is an S-shaped curve.

(3) Perceived attributes of an innovation, such as its relative advantage (over the old idea), its compatibility (with existing values or client needs) and its complexity (in use), can be used to explain the rate of adoption.

(4) The relative advantage of an innovation is the degree to which such an innovation is perceived as better than the idea it supersedes. It is positively related to the rate of adoption.

(5) Compatibility is the degree to which an innovation is perceived as consistent with the existing values and needs of potential adopters. It is also positively related to the rate of adoption.

(6) Complexity is the degree to which an innovation is perceived as relatively difficult to understand and use. And unlike relative advantages and compatibility, it is negatively related to the rate of adoption.

### Link Between Circulation and Adoption Year

In the case of diffusion of computers in the Chinese-language newspapers in Taiwan, the data supports the hypothesis that circulation size has a lot to do with the adoption of new technology.

For example, newspapers with larger circulation seem to adopt computer technology earlier than those with smaller circulation. Before 1988, the six newspaper companies that had adopted computers had circulation exceeding 249,999. And up to now, three newspapers with distribution sizes below 124,999 have not taken a step toward computerization. Two of the three not planning to adopt computers also cited circulation sizes as the reason.

Another factor in the relationship between circulation and diffusion of computer facilities is the presence of on-line equipment.

Compared with older machines such as stand-alone computers needing paper work to "talk" with each other, on-line equipment is an innovation because it allows such communication to be carried through telephone wires at electronic speed. Therefore, online equipment can function faster than stand-alone computers.

The adoption of this innovation among the Taiwanese press also has to do with the circulation size. Among the 18 computerized newspaper companies, the only three that have on-line equipment all have circulation bigger than 250,000.

A third instance is the presence of incentives for the reporters who are willing to train themselves to use terminals to be installed in the editorial department.

Such training is a preparation for adopting newsroom terminals that allow reporters to directly input their stories: Incentives for reporters to train themselves would probably facilitate the use of the terminals among the reporting staff.

Circulation seems to relate to this innovation. All five newspapers that will use incentives to facilitate the diffusion have circulation between 250,000 and 2 million. And, except for the China Times, which has a circulation between 1 and 1.49 million, all of the seven others not offering such incentives have circulation under 499,999 (see table 8).

Yet another example about the relationship between circulation and adoption rate is the types of backup systems the computerized newspaper companies used.

Some newspapers use computers to back up the normally functioning system. Compared with the pre-computer equipment that was used by others as backups, the backup computer is an innovation because it can process information faster than the old equipment.

In this case, the relation between circulation and backup computer innovation is positive. The newspaper companies adopting computers as backup for the normal automation systems generally have larger circulation.

Judging from the four cases, it is clear that the adoption of various computer facilities are often started by newspapers with bigger circulation sizes.

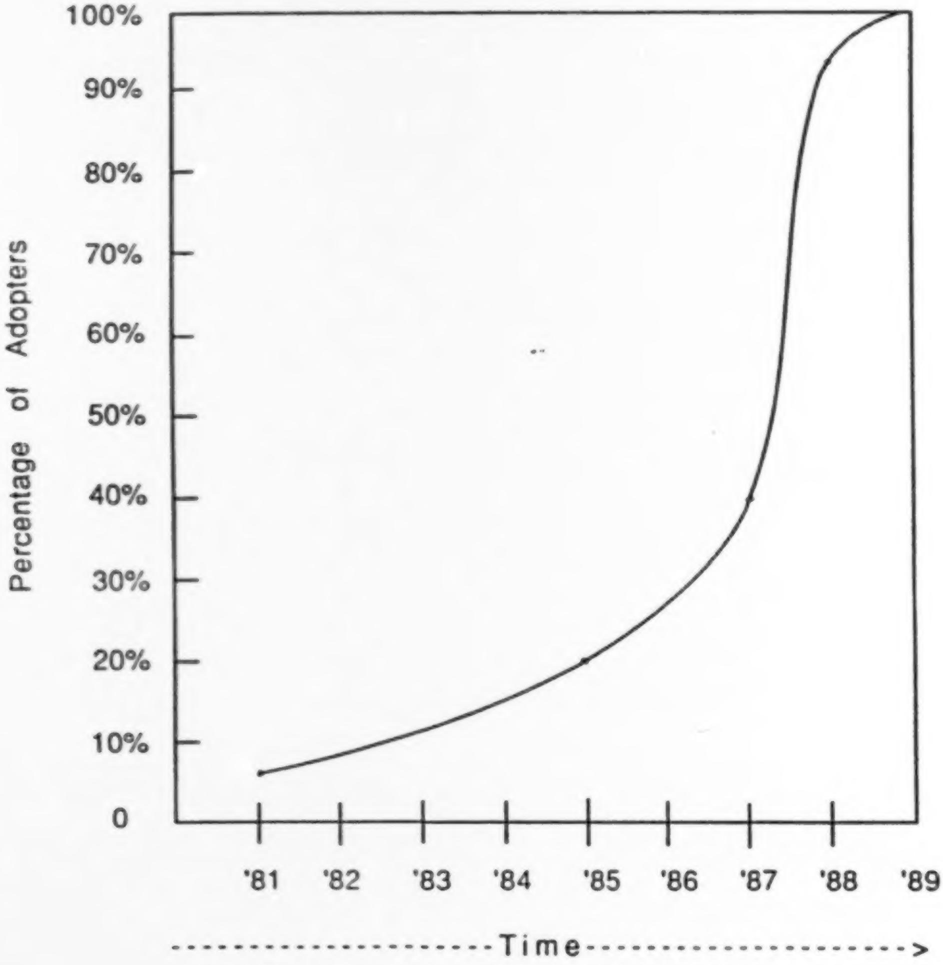
This phenomenon can be explained using a generalization in the diffusion theory: Early adopters have larger units (farms, etc.) than later adopters.

It can also be looked this way: The larger the unit is the better its ability to sustain risks from ventures.

Another reason that explains adoption is also economically based: After becoming an earlier adopter, larger newspapers can sometimes enjoy unique benefits that are not fully exploited yet. For example, in the case of on-line systems, larger newspaper companies probably are concerned about the faster processing speed from on-line equipment that can raise the efficiency of the newspaper. The companies probably believe that such equipment can provide more timely stories and better serve the readers through faster distribution. Such faster speed not only will bring more revenues but also could be a unique business strength for the paper, making it more competitive than its opponents in the markets.

Therefore, from the point of diffusion theory, the fact that the early adopters of various computers in the Taiwanese press are all bigger newspaper companies means two things. First, they are more able to sustain costs of innovation failures as they are also generally richer compared to smaller newspapers. Second, by adopting an innovation at an early stage of its introduction, the newspaper company exerts its intention of trying to beat its competitors using the advantage of computer innovation, which may be unique in the sense that it has not yet been adopted by other companies. The net results probably would help bigger and powerful newspapers retain their strength for a much longer period of time.

**Figure 3. Taiwanese Newspaper Computer-Adoption Curve 1981-1989**



## S-shaped Adoption Curve

According to the diffusion of innovations theory, after the early adopters, the growth of adopters first takes off at an increasing rate, but after a certain period of time, it will wind up in a decreasing tempo. If the percentage of total adopters is plotted in a chart over time, the result is an S-shaped curve.

This generalization can also be used to explain the cumulative number of newspaper companies adopting computers over the years in Taiwan. In 1981, there was only one newspaper using computers, which is only six percent of the 15 computerized newspaper companies. The number then rose with an accelerating rate--two were added in 1985 to reach three, which is 20 percent of the current 15 adopters. Two years later in 1987 they were joined with another three to become six, 40 percent of the current 15 adopters. One year later in 1988, eight more were accumulated into the number, making 14, 93 percent of the 15 currently computerized newspaper companies. After this point, the growth rate slowed down. In 1989, only one more newspaper company computerized and the number of adopters reaches the current total of 15. Just as the generalization in the diffusion theory states, the cumulative number of newspaper companies adopting computerization yearly, if plotted in charts, is also an S-shaped curve (see figure 3).

## The Attributes Behind Adoption of Computers

Various attributes of computer innovation as perceived by the Chinese-language newspaper companies in Taiwan will be discussed and explained. All or some of them were then combined to analyze the diffusion of computers in the Taiwanese press.

For the sake of clarity, the attributes such as the relative advantage of an innovation (over the old idea), its compatibility (with values and needs), and its complexity (in use) will be dealt with one after the other.

## Relative Advantages of Computer Innovation

For the newspaper companies that adopted computers, one of the most important perceived attributes is the savings of time. In the pre-computer era, the typesetting in the Chinese-language newspapers was done manually, which confined its speed to 1,200 words per hour due to the physical limits of typesetters. Another factor that caused the slow processing of typesetting is the daily re-molding of type because each of them could only be used once, and the re-molding also has a speed limit [59]. With the advent of computers, pages can be typeset with a keyboard, whose speed is much faster than the old methods of picking the right types and putting them in the right places of the page. The time saved this way is to the advantage of the newspaper companies because the relaxed deadlines result in the ability to include more late-breaking news and allow for more careful proofreading of stories. And a more informative and accurate newspaper will probably draw more readers, which will, in turn, bring more advertisers to support the paper. As most newspapers mentioned the saving of time [60] as one of the reasons to move toward computerization, it should be regarded as coming from the "perceived" advantages of computer technology.

Another relative advantage frequently mentioned by the newspaper companies is cost reduction. This is a relative advantage brought by computers over the pre-computer typesetting systems because of two reasons. In the newspaper business, costs are fixed and hard to reduce unless ways are found to do several jobs at the same time. Computerization helps newspaper companies reduce costs through cutting jobs in the composing room [61]. This is a great advantage because reduced operational costs means greater profits. Second, the cost reduction from the elimination of jobs also allows the newspapers to have more money to hire new workers to improve the paper. For example, the money saved from composing room job reductions can be used to hire more reporters or purchase more equipment for the needs of expanding the paper. This had actually been done at the United Daily News [62]. As most of the 15 computerized newspaper companies cited cost reduction as the reason to move toward automation, the advantage is perceived by the adopters (newspaper companies).

A third relative advantage as perceived by some of the computerized newspapers is the improved printing quality of the newspaper. With computers, editors can more efficiently control the colors of the photos and page layout design than they could with pre-computer equipment. Instead of having to see the hard copy of pages, they can monitor the page through the computer monitor and manipulate them electronically. This is an advantage because papers of better printing quality are more desirable to buyers. This advantage is perceived by two newspaper companies, which cited these as part of the reasons they adopted computer technology.

In conclusion, most newspapers perceived computer innovation to have the relative advantage of time savings and cost cutting over pre-computer equipment. Also a few acknowledged the relative advantage of improved printing quality.

### Compatibility of Computer with Values, Needs

The compatibility of an innovation lies in two aspects: (1) the consistency of the innovation with existing values and (2) the consistency of the innovation with the needs of potential adopters.

In the case of the automation of Chinese-language newspapers in Taiwan, the innovation can be compatible with traditional news values there.

Specifically, the use of computers, which helped many newspapers save 40 to 60 minutes, is consistent with the news value of timeliness that has been practiced in the Taiwanese press [63].

Moreover, the compatibility with newspaper needs can also be used to explain the adoption of computers by the Chinese-language newspapers in Taiwan. For the convenience of analysis, all the reasons mentioned by newspaper companies for adopting computers are treated as the companies' needs for such an adoption.

Take the need for cost reduction, which is perceived by 12 computerized newspapers, for example. Many newspapers said they adopt typesetting computers because the cutting of typesetting jobs can meet their need of reducing production costs. For similar reasons, most computerized newspapers either have pagination software or planned to install the program because the software can meet the newspaper's need to cut paste-up jobs in the composing room.

Another instance of compatibility lies in the fact that the adoption of computer equipment is consistent with the newspaper's need to improve printing quality, which is perceived by two of the newspaper companies surveyed.

A third case of compatibility of computer innovation with newspaper needs is that adoption is consistent with the need to protect labor health, also cited by two of the 18 computerized newspaper companies. This is so because the conventional typesetting method requires re-molding of lead types, which would generate toxic exhaust harmful to employees' health. Replacing such equipment with gas-less computers can solve the need to provide cleaner working conditions.

There are additional explanations by the newspaper companies surveyed on how adoption of computers satisfies their needs. One newspaper company said the measure helped facilitate personnel management. Another mentioned the innovation's meeting the need to process files in its business departments.

To sum up, adopting computers is compatible with the timeliness practiced in the Taiwanese press. Also, most newspapers perceived adoption of the innovation as being consistent with the need for cost reduction. In addition, a few newspapers said that adopting the technology is consistent with the needs to improve printing quality, provide better working conditions, facilitate personnel management and process files in business departments.

### Complexity in Use and Understanding of Computers

Among problems that would complicate the use or understanding of the computer.

adopted by the 15 Taiwanese newspaper companies, labor problems are among the most important ones. However, due to mutual understanding between employees and managers, this problem is not as serious as those faced by U.S. newspapers. Of 15 newspapers that are computerized, about four mentioned that they have such a problem. As a result, the labor problems do not affect generally the use of computers in Taiwanese newspapers.

There is another important complicating problem as perceived by four newspapers--employees need training to be familiar with the processing of news copy.

Other minor problems include the updating of equipment, which is cited by two of the newspaper companies surveyed. The two noted that the lack of standardized computers spells trouble for planned expansion. This is so because the newspapers not planning to repurchase equipment of the same brand have to make sure there are interfaces available to integrate the new machines with the old system.

There are two least perceived problems that complicate the use or understanding of newspaper computers, each mentioned by one of the companies surveyed. One arises because reporters are still writing stories long hand--their cursive writing has complicated typesetters' jobs to input the text. Another is that journalism school students, who will probably wind up working at newspapers, lack the understanding of computers because their schools did not teach such knowledge.

All in all, the problems perceived by the Taiwanese press as possible obstacles in the use or understanding of computers are many. But not one of them is perceived by more than four newspapers. Therefore, the perceived complexity of the use and understanding of the computer innovation is not serious.

## Explaining Adoption Using Perceived Attributes

In general, of the perceived attributes that affect the adoption of new technology, the perceived advantage of an innovation (over old idea) and its perceived compatibility (with existing values and client needs) are positively related to the rate of adoption. In addition, the perceived complexity with the use and understanding of the innovation is negatively related to the adoption rate.

Specifically, the increasing number of newspaper companies adopting computer technology in the Taiwanese press since 1981 can be explained using these generalizations. Also, these general statements can be applied to understand why two of the 18 newspaper companies have not yet planned to adopt computers.

Since 1981, a growing number of newspapers have adopted computers. The increasing adoption rate can be explained through examining the generalizations on the attributes of the innovation as perceived by the 18 computerized newspapers. It is found that the relative advantages of the innovation over the pre-computer equipment--time savings and cost reduction--are perceived by most of the computerized newspaper companies. In addition, the compatibility of computers with the existing news value of timeliness and various newspaper needs is also perceived by most newspapers. On the contrary, the complexity of the innovation seems to be recognized by only a small portion of newspaper companies. For the 18 companies, the perceived advantages and compatibility of computers--which is positively related to the adoption rate--is salient, while the perceived complexity is not widespread. As a result, theoretically the adoption rate of computers should be high among the 18 companies. This explains why there has been a steady growth of newspapers adopting computers since 1981.

For the two newspapers [64] that do not plan to move toward automation, the relative advantages perceived by the 15 computerized newspaper companies were not relevant. For example, the companies think that because the papers only have six pages, the speed of manual typesetting is fast enough to beat the deadline. Time savings was therefore unable to be acknowledged as an advantage of computer innovation over the original equipment. In addition, the innovation is not deemed as compatible with the needs of both companies. Due to small circulation, the two believe that manual typesetting is enough to meet daily needs. Although it is uncertain whether the two have complicating problems as to the use and understanding of computers, it is clear that the two could not perceive the advantages of computer innovation nor could they reconcile its compatibility with their needs. Since the generalizations of diffusion theory state that the two attributes are positively related to the diffusion of an innovation, an absence of such attributes means adoption of the innovation is not probable. This explains why the two newspapers do not plan to move toward automation.

## Conclusion

Most Taiwanese newspapers computerized their news production in the 1980s, about two decades after the computerization of their English-language counterparts in the United States. One of the reasons for the delay is the complexity of the language. Compared with the 26 alphabetical letters in English, the building block of common Chinese newspaper language consists of some 6,000 ideographic characters. This study tries to address the relatively more complicated computerization in Taiwan and analyze the adoption of computer innovation with the diffusion of innovations theory.

Among the 28 newspapers surveyed, 26 returned the questionnaires. Because half of those that responded belong to five companies, the actual units of analysis are 18 newspaper companies. Fifteen of the 18 companies are computerized. The most important reasons cited for computerization were cost cutting and time saving. The computers are mostly used for typesetting purposes. Because computers increase the speed of typesetting, the number of composing room jobs was reduced, resulting in cost savings. Also, as word-processing speed increases, much time was saved.

Unlike their U.S. counterparts, the Taiwanese newspapers did not face serious labor problems during the computerization. Part of the reason is that the newspapers had either transferred laid-off workers to other departments or given them pensions according to the law. Another reason is that labor and management have more mutual understanding that compromising is a better way to solve differences.

The increasing number of Taiwanese newspapers adopting computers since 1981 can be explained using the three perceived attributes under the diffusion of innovations theory: (1) the perceived relative advantage of an innovation over the old idea; (2) its compatibility with existing values and needs of potential clients; and (3) its complexity in use and understanding. Most Taiwanese newspapers recognize the relative advantage (of computer innovation) in time and cost savings. They also believe that computerization is compatible with the news value of timeliness and the newspaper's needs to save time and money. In addition, the problem of complexity in use is not perceived as serious. Because the first two attributes are positively related to the rate of adoption and the third is negatively related to the adoption rate, the salient state of the first two attributes and the obscurity of the third attribute explain why there had been an increasing number of adopters in early- and mid-1980s.

The diffusion of innovations theory also can be used to explain why the number of new adopters kept rising until 1988 and has fallen since then. The phenomenon can be explained through the rationale behind the S-shaped curve, which shows the number of new adopters rises at the accelerating rate at first but eventually falls at a diminishing rate. Another theoretical generalization that earlier adopters have larger units and are wealthier can also be used to explain why, in general, it was larger newspapers that took the first step toward computerization in Taiwan.

**Notes:**

[1] Susan T. Bennett, M.A. thesis, The Computer Revolution and the Modern Newspaper: A Descriptive Survey of Computer Use in the Nation's Press (University of Florida, 1971, unpublished), p. 3.

[2] Manuel A. Pinell, M.A. thesis, Computer in the Newspaper: From the Reporter to the Press (University of Missouri, 1974, unpublished), p. 62.

[3] Pinell, op. cit., p. 57.

[4] Pinell, op. cit., p. 36.

[5] Interview with Chia-hsiang Chang, head of the ROC Press Association, May 20, 1989. Chang is also the general manager of Taiwan Daily News (Taichung, 1989 circulation: 260,000).

[6] Editor & Publisher International Yearbook (New York: Editor & Publisher, 1988), sec. IV, pp. 83-84.

[7] Interview with Frank F. Na, who is in charge of newsroom computers at the United Daily News Group, Jan. 9, 1989.

[8] Interview with Chang, May 20, 1989. Discussions with and Jixuan Xia and Zhinian Zhang, journalists in the People's Republic of China who were students at University of Missouri-Columbia School of Journalism in 1989. Also talks with Pao-ching Lin, Washington, D.C., correspondent for the New York-based, Chinese-language newspaper World Journal (1989 circulation: 100,000), June 24, 1989.

[9] Editor & Publisher International Yearbook, op. cit., sec. IV, pp. 83-84. According to the book, the 28 newspapers are Shang Kung Daily News, Keng Sheng Daily News, Cheng Kung Evening News, Chung Kuo Evening News, Min Chung Daily News, Hsin Wen Pao, Kinmen Daily News, Matsu Daily News, Chien Kuo Daily News, Chung Kuo Daily News, Daily Free Press, Min Sheng Daily News, Taiwan Daily News, China Daily News (Chung Hwa Jih Pao), Central Daily News, China Times, Chung Cheng Pao, Commercial Times, Economic Daily News, Great China Evening News, Independent Evening Post, Mandarin Daily News, Min Tsu Evening News, Min Sheng Pao, Taiwan Hsin Sheng Pao, United Daily News, Youth Warrior Daily. According to Chang, Youth Daily Warrior changed its name to Youth Daily News and Daily Free Press became Liberty Times. Also , Shang Kung Daily News, Cheng Kung Evening News, Min Sheng Daily News, Min Tsu Evening News and Great China Evening News closed because of financial troubles. In addition, Pacific Daily News, China Evening News, United Evening News, Shin Wen Evening News and Indepedent Morning News emerged as new papers in Taiwan.

[10] Elihu Katz, Martin L. Levin, Herbert Hamilton, "Traditions of Research on the

Diffusion of Innovation" in American Sociological Review (Washington D.C.: The American Sociological Association, 1963), pp. 237-252.

[11] Na said in a May 22, 1989, interview that Hongkong newspapers are reluctant to install computers as the 1997 Communist takeover approaches. He also said that in Singapore, the largest Chinese community outside China, Taiwan and Hongkong, newspapers' circulation are generally too small to allow them to benefit from investment in computerization. Finally, according to a report in an overseas edition of the Beijing-based Renmin Ribao (People's Daily) and interviews with Xia and Zhang, in China computerization of newspapers was just beginning.

[12] The New American Desk Encyclopedia (New York, N.Y.: New American Library, 1984), pp. 243-245, 551 and 1802; The New Encyclopaedia Britannica (University of Chicago, Chicago: Encyclopaedia Britannica, Inc., 1983), vol. IX, p. 226. According to the reference books, China has 1.06 billion Chinese, Taiwan has 17.8 million, Hongkong has 5.12 million and Singapore has 1.9 million.

[13] Everett M. Rogers, Diffusion of Innovations (New York, N.Y.: The Free Press, 1983), p. 1.

[14] Rogers, op. cit., pp. 10, 11, 35 and 37. An innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption. A communication channel is the means by which messages get from one individual to another. A social system is a set of interrelated units that are engaged in joint problem solving to accomplish a common goal.

[15] Rogers, op. cit., pp. 11 and 15.

[16] Everett M. Rogers, F., Floyd Shoemaker, Communications of Innovations (New York, N.Y.: The Free Press, 1971), pp. 186-187.

[17] Rogers, Shoemaker, op. cit. p. 177.

[18] Bennett, op. cit., p. 86.

[19] Bennett, op. cit., p. 86.

[20] Rogers, Shoemaker, op. cit., p. 186.

[21] Rogers, Shoemaker, op. cit., p. 182.

[22] At the end of 1961, only three computers were utilized by newspapers, but in 1970, there were at least 384 computerized dailies (Bennett, op. cit., p. 3.), which was about 29.5 percent of all 1,754 U.S. dailies at that time (Ben H. Bagdikian, Information Machines (New York, N.Y.: Harper & Row, 1971), p. 71). And according to Joseph Lorfano, manager of public information at the American Newspaper Publishers Association, an estimated 80 percent of the 1798 U.S. dailies had adopted computers in 1980. He also estimated that all U.S. dailies had been computerized in 1985. Figure 2 is

based on this information.

[23] Rogers, op. cit., p. 210. Because an innovation can be viewed differently by different individuals (Rogers, op. cit., p. 15), during the adoption process it is the individual's perception that influences the rate of adoption.

[24] Rogers, op. cit., p. 212.

[25] Rogers, op. cit., p. 218.

[26] Rogers, op. cit., p. 225 and 226.

[27] Rogers, op. cit., p. 15.

[28] Pinell, op. cit., p. 41-49.

[29] Pinell, op. cit., p. 57.

[30] Rosalind C. Truitt, "Another PC Breakthrough" in Press Time (Reston, Va.: American Newspaper Publishers Association), November, 1987, p. 66.

[31] Jim Rosenbery, "PCs Can Do a Multitude of Things" in Editor and Publisher, September 3, 1988, p. 30pc.

[32] George Garneau, "1985-in-Review: Technology for Newspapers Continues to Accelerate" in Editor and Publisher, April 1, 1986, p. 40.

[33] George Garneau, "Personal Computers--The Fourth Wave" in Editor and Publisher (Sept. 3, 1988), p. 1pc.

[34] Figures were provided by Lorfano. He also said the boom in computer use is a direct result of the increasing purchase of PCs by small newspapers and weeklies.

[35] Rogers, op. cit., p. 223. In the original text, the compatibility with past experiences is also included. However, for the purposes of computerization, this aspect is not relevant.

[36] Brian S. Brooks, George Kennedy, Daryl R. Moen, Don Ranly, op. cit., pp. 10-11.

[37] Brian S. Brooks, George Kennedy, Daryl R. Moen, Don Ranly, op. cit., p. 12.

[38] George Garneau, "1985-in-Review: Technology for Newspapers Continues to Accelerate" in Editor and Publisher (Jan. 4, 1986), p. 41.

[39] William C. Porter, "Eventually--Pagination Saves Time" in Editor and Publisher (June 21, 1986), p. 32.

[40] Michael and Edwin Emery, op. cit., p. 642.

[41] Michael and Edwin Emery, op. cit., p. 643.

[42] Bennett, op. cit., p. 120.

[43] Bennett, op. cit., p. 45. Since the initial confrontation of unions and management over automation at the Palm Beach Post-Times and Pensacola News-Journal, strikes occurred by 1971 in at least 11 cities and towns.

[44] Interview with Lorfano, July 12, 1989.

[45] Jim Rosenberg, "PCs Can Do a Multiple of Things" in Editor and Publisher (Sept. 3, 1988), p. 30pc.

[46] Jim Rosenberg, "Digital Systems and Compatibility" in Editor and Publisher (April 8, 1989), p. 54.

[47] Interview with Lorfano, July 12, 1989.

[48] The author has worked at the English-language China Post for two years as proofreader and news writer. His father, Chia-hsiang Chang, is the general manager at the Chinese-language Taiwan Daily News (Taichung, Taiwan, 1989 circulation: 260,000).

[49] Roger D. Wimmer, Joseph R. Dominick, Mass Media Research (Belmont, Calif.: Wadsworth Publishing Co., 1987), p. 102.

[50] The questionnaire were sent to six Chinese-language newspapers in Hongkong, three in Malaysia, one in Indonesia and two each in Macao, the Philippines, Singapore and Thailand.

[51] Norman H. Die, C. Haldlai Null, Jean G. Jenkins, Karin Steinbrenner, Dale H. Bent, SPSS: Statistical Package for Social Sciences (New York, N.Y.: McGraw Hill Book Co., 1987).

[52] Survey results indicate that China times, China Evening News and Commercial Times are one newspaper group; Chung Kuo Daily News and Chung Kuo Evening News are under one company; Independent Evening News and Independent Morning News belong to a group; Shin Wen Pao and Shin Wen Evening News are one company; and United Daily News, United Evening News, Min Sheng Pao and Economic Daily News are owned by the same newspaper system. Newspapers inside a group or company share the same computer equipment.

[53] In English-language newspapers, the increase of speed is achieved through elimination of the same text matter. According to a 1989 article in the Taiwan-based, Chinese-language Information and Computer (Taipei, Taiwan) for Chinese-language newspapers, the speed gain results from avoiding daily remolding of lead types and the slow process of putting the types in the right place of the designed page plate.

[54] Information and Computer, op. cit. According to the source, the remolding of lead creates toxic exhaust that pollutes the air in the working environment, damaging the health of typesetters.

[55] Survey results showed the daily word processing speed in the Times increased from 650 words per person in the pre-computer era to 4,500 words after its computerization in 1987.

[56] The newspaper group of Chung Kuo Daily News and Chung Kuo Evening News did not disclose whether its computerization resulted cost reduction.

[57] Telephone interview with Chang, July 10, 1989. According to Chang, Taiwan unions are all very new because they were established since the lifting of martial law two years ago. He also said that unlike U.S. workers, who had learned that unreasonable demands will harm both workers and capitalists, inexperienced Taiwanese worker unions in general like to stage strikes to demand whatever they believe are their rights.

[58] The prescription is stated in the Seventeenth Statute of Taiwan's Labor Standards Law.

[59] Information and Computer, op. cit.

[60] Thirteen of the 15 newspaper computerized said that after automation, word-processing speed in the composing room became two to three times compared of the speed in pre-computer era.

[61] Survey results show that most newspaper have cut half of typesetting jobs in the composing room.

[62] Interview with Na, January 10, 1989. Na said some of the money saved from computerization have been used to increase computer facilities to meet the needs for the expansion of the newspaper. The total page number of the paper had been doubled to 24 in January, 1989.

[63] Hung-chun Wang, Hsinwen Tsaifang Hsueh (Taipei, Taiwan: Cheng Chung Book Co., Ltd., 1988), p. 6.

[64] According to an interview with Chang on March 20, 1989, the two papers, Kinmen Daily News and Matsu Daily News, belong to the government. Chang said, however, that government policies have little to do with the dailies' decision on whether to adopt computers.